



Case No.: 14-0264-EL-EEC

Mercantile Customer: Jo-Ann Stores Inc

Electric Utility: Ohio Edison Company

**Program Title or
Description:** Penthouse Upgrades, Print Shop Renovation and Dual Duct
Replacement Phase 1

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 to 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: Jo-Ann Stores Inc

Principal address: 5555 Darrow Rd Hudson, Ohio 44236

Address of facility for which this energy efficiency program applies: Same

Name and telephone number for responses to questions: Debbie Mansfield #330-656-2600

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. (Please attach documentation.)
- ☐ 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: Ohio Edison Company

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)). **If Checked, Please see Exhibit 1 and Exhibit 2**
- ☐ 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):
_____.
- ☐ 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: 605,532 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. **Please see Exhibit 1 if applicable**

- 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: _____ kWh

Please describe the less efficient new equipment that was rejected in favor of the more efficient new equipment. **Please see Exhibit 1 if applicable**

- 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?
- Please reference Exhibit 2
- C) What is the peak demand reduction achieved or capable of being achieved (show calculations through which this was determined):

91 kW

**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 \$36,332. (Rebate shall not exceed 50% project cost. Attach documentation showing the methodology used to determine the cash rebate value and calculations showing how this payment amount was determined.)

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: **See Exhibit 3** (Skip to Subsection 2.)

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 **See Exhibit 3**

The utility's program costs were **See Exhibit 3**

The utility's incentive costs/rebate costs were **See Exhibit 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.
- 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.



Public Utilities Commission

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

Case No.: 14-0264-EL-EEC

State of Ohio :

Debbie Mansfield, Affiant, being duly sworn according to law, deposes and says that:

1. I am the duly authorized representative of:

Jo-Ann Stores Inc

[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.

Signature of Affiant & Title

Director, Energy & Facilities

Sworn and subscribed before me this 3RD day of APRIL, 2014 Month/Year

Signature of official administering oath

Velma M. Quinlan, SRP Admin
Print Name and Title

My commission expires on _____

VELMA M. QUINLAN
NOTARY PUBLIC, STATE OF OHIO
My Commission Expires 8/28/2017

Customer Legal Entity Name: JoAnn Stores Inc

Site Address: JoAnn Fabric Corporate Offices and Distribution Center

Principal Address: 5555 Darrow Rd

Project No.	Project Name	Narrative description of your program including, but not limited to, make, model, and year of any installed and replaced equipment:	Description of methodologies, protocols and practices used in measuring and verifying project results	What date would you have replaced your equipment if you had not replaced it early? Also, please explain briefly how you determined this future replacement date.	Please describe the less efficient new equipment that you rejected in favor of the more efficient new equipment.
1	Penthouse Upgrades	This project entailed removing two existing HR-195 195 ton reciprocating chillers used to supply chilled water to dual duct air handlers located in separate North and South penthouse mechanical rooms. The two chillers were replaced with 30HXC 244 ton chillers. The original piping to the chilled water coil did not include a chilled water control valve. As part of the project the chilled water pumps were fitted with variable speed drives. These are controlled to act as capacity control for the chilled water coil, allowing the centrifugal chillers to operate at minimum required capacity for prolonged periods and to reduce pump horsepower requirements. +Included in the project was modifications to the air handlers mixing section dampers. These dampers were the original dampers provided with the air handling unit. The measured leakage rate was in excess of 45% with the dampers at minimum position. The damper closure was not possible, thus when the air handling system shutdown the estimated leakage rate was in excess of 15%. The unoccupied savings was not calculated since the chilled water system was held off after hours. ---BAS modification include comparative enthalpy economizer control and demand controlled ventilation (CO2). +Cooling tower savings are based on reduced operation hours and modifications to the existing BAS sequence of	Please reference the Chiller , Tower,Control & VFD upgrade and optimization calculations attached.	Approx year 2018. At that time we estimated that the chiller repair , parts availability , operational and on-going maintenance costs would warrant replacement.	N/A
2	Print Shop Renovation	Replaced 25 ton air cooled D.X air handler with new air handler and Carrier 30RAP chiller. New air handler included low leakage dampers. Eliminated 24/7 3 hp exhaust system. Integrated chiller and AHU controls with existing BAS.	Please reference the Print Shop renovation upgrade and optimization calculations attached.	Approximately 2016. We estimated that the on going energy cost, equipment repair, and parts availability would warrant replacing the existing system.	N/A
3	Dual Duct Replacement Phase 1	Replaced existing pneumatically controlled constant volume dual duct mixing boxes with electronically controlled dual duct VAV mixing boxes. Air is supplied to the boxes by AHU-1. Boxes are interfaced with existing BAS. The change to VAV and optimized control sequences allows AHU-1 supply and return exhaust fans to operate at reduced speeds. It also prevent's simultaneous heating and cooling which was prevalent with the original boxes. Additional boxes were installed to match the current office usage and improve occupancy scheduling.	Please reference the Dual Duct upgrade and optimization calculations attached.	Approximatley yr 2017. We estimated the replacement cost for single boxes , that would have been replaced as they failed. We estimated the energy savings of VAV boxes compared to present operation. The result was that early replacement made financial sense, as it increased office comfort levels and reduced energy usage.	N/A

Docket No. 14-0264

Site: 5555 Darrow Rd

Exhibit 2

Customer Legal Entity Name: Jo-Ann Stores Inc
Site Address: JoAnn Fabric Corporate Offices and Distribution Center
Principal Address: 5555 Darrow Rd

		Unadjusted Usage, kwh (A)	Weather Adjusted Usage, kwh (B)	Weather Adjusted Usage with Energy Efficiency Addbacks, kwh (c) <i>Note 1</i>						
2012		10,522,947	10,522,947	10,522,947						
Average		10,522,947	10,522,947	10,522,947						
Project Number	Project Name	In-Service Date	Project Cost \$	50% of Project Cost \$	KWh Saved/Year (D) counting towards utility compliance	KWh Saved/Year (E) eligible for incentive	Utility Peak Demand Reduction Contribution, KW (F)	Prescriptive Rebate Amount (G) \$	Eligible Rebate Amount (H) \$ <i>Note 2</i>	Commitment Payment \$
1	Penthouse Upgrades	06/01/2013	\$541,845	\$270,923	351,019	351,019	78	\$28,082	\$21,062	
2	Print Shop Renovation	06/01/2013	\$459,378	\$229,689	182,112	182,112	13	\$14,569	\$10,927	
3	Dual Duct Replacement Phase 1	12/01/2013	\$444,000	\$222,000	72,401	72,401	-	\$5,792	\$4,344	
					-	-	-	\$48,443	\$36,332	\$0
					-	-	-			
					-	-	-			
					-	-	-			
Total			\$1,445,223		605,532	605,532	91	\$48,443	\$36,332	\$0

Docket No. 14-0264
Site: 5555 Darrow Rd

Notes
(1) Customer's usage is adjusted to account for the effects of the energy efficiency programs included in this application. When applicable, such adjustments are prorated to the in-service date to account for partial year savings.
(2) The eligible rebate amount is based upon 75% of the rebates offered by the FirstEnergy Commercial and Industrial Energy Efficiency programs or 75% of \$0.08/kWh for custom programs for all energy savings eligible for a cash rebate as defined in the PUCO order in Case NO.10-834-EL-EEC dated 9/15/2010, not to exceed the lesser of 50% of the project cost or \$250,000 per project. The rebate also cannot exceed \$500,000 per customer per year, per utility service territory.

Exhibit 3 Utility Cost Test

UCT = Utility Avoided Costs / Utility Costs

Project	Total Annual Savings, MWh (A)	Utility Avoided Cost \$/MWh (B)	Utility Avoided Cost \$ (C)	Utility Cost \$ (D)	Cash Rebate \$ (E)	Administrator Variable Fee \$ (F)	Total Utility Cost \$ (G)	UCT (H)
1	351	\$ 308	\$ 108,212	\$ 1,350	\$21,062	\$0	\$ 22,412	4.8
2	182	\$ 308	\$ 56,141	\$ 1,350	\$10,927	\$0	\$ 12,277	4.57
3	72	\$ 308	\$ 22,320	\$ 1,350	\$4,344	\$0	\$ 5,694	3.92
Total	606	\$ 308	186,673	4,050	\$36,332	\$0	40,382	4.6

Notes

(A) From Exhibit 2, = kWh saved / 1000

(B) This value represents avoided energy costs (wholesale energy prices) from the Department of Energy, Energy Information Administration's 2009 Annual Energy Outlook (AEO) low oil prices case. The AEO represents a national average energy price, so for a better representation of the energy price that Ohio customers would see, a Cinergy Hub equivalent price was derived by applying a ratio based on three years of historic national average and Cinergy Hub prices. This value is consistent with avoided cost assumptions used in EE&PDR Program Portfolio and Initial Benchmark Report, filed Dec 15, 2009 (See Section 8.1, paragraph a).

(C) = (A) * (B)

(D) Represents the utility's costs incurred for self-directed mercantile applications for applications filed and applications in progress. Includes incremental costs of legal fees, fixed administrative expenses, etc.

(E) This is the amount of the cash rebate paid to the customer for this project.

(F) Based on approximate Administrator's variable compensation for purposes of calculating the UCT, actual compensation may be less.

(G) = (D) + (E) + (F)

(H) = (C) / (G)

Jo-Ann Stores Inc ~ JoAnn Fabric Corporate Offices and Distribution Center
Docket No. 14-0264

Site: 5555 Darrow Rd

JoAnn Hudson Chiller Replacement Project
Hudson, Ohio
FE Rebate Information
2/4/2014

	Existing	Red. Existing	New	Avoided
Chiller Replacements				
Replace North and South Chillers	418,645		151,789	266,856
Chilled water pump savings				
Reduced hours of operation	47,622	37,679		9,943
Variable Flow Pumping		37,679	26,375	11,304
Cooling tower savings				
Reduced hours of operation	72,997	57,756		15,241
BAS sequence optimization		57,756	41,584	16,172
Damper Replacements				
Replace North and South mixing dampe	95,433		63,929	31,504
<u>Totals</u>	<u>634,697</u>		<u>283,678</u>	<u>351,019</u>

**JoAnn Hudson Chiller Replacement Project
Hudson, Ohio**

	\$ Saved	kWh Saved
<u>Chiller Replacements</u>		
Replace North and South Chillers	\$24,017.00	266,856
<u>Chilled water pump savings</u>		
Reduced hours of operation	\$894.87	9,943
Variable Flow Pumping	\$1,017.33	11,304
<u>Cooling tower savings</u>		
Reduced hours of operation	\$1,371.70	15,241
BAS sequence optimization	\$1,455.45	16,172
<u>Damper Replacements</u>		
Replace North and South mixing dampe	\$2,835.38	31,504

This project entailed removing two existing HR-195 195 ton reciprocating chillers used to supply chilled water to dual duct air handlers located in separate North and South penthouse mechanical rooms. The two chillers were replaced with 30HXC 244 ton chillers. The original piping to the chilled water coil did not include a chilled water control valve. As part of the project the chilled water pumps were fitted with variable speed drives. These are controlled to act as capacity control for the chilled water coil, allowing the centrifugal chillers to operate at minimum required capacity for prolonged periods and to reduce pump horsepower requirements.

Included in the project was modifications to the air handlers mixing section dampers. These dampers were the original dampers provided with the air handling unit. The measured leakage rate was in excess of 45% with the dampers at minimum position. The damper closure was not possible, thus when the air handling system shutdown the estimated leakage rate was in excess of 15%. The unoccupied savings was not calculated since the chilled water system was held off after hours. ---BAS modification include comparative enthalpy economizer control and demand controlled ventilation (CO2).

Cooling tower savings are based on reduced operating hours and modifications to the existing BAS sequence of operation.

Estimated Chiller Energy Savings

kWh Avoided	<u>319,515</u>	
Total Savings	\$28,756	

Chiller Replacements**HR 195 Carrier Recip Chiller (5 compressors)**

Existing North chiller usage		
Hours/Month = (14 Hours*6.5 days*4 wks)	364	hrs.

Chiller kW/ton at Cond. ENT

75° = 167 kW / 191 Tons	0.87	kW
80° = 173.5 kW / 186 Tons	0.93	kW
85° = 179.6 kW / 181 Tons	1.01	kW
90° = 185 kW / 176 Tons	1.05	kW

kW per compressor at full load (@40 Tons)

75° = .875 kW/ton x 39T	0.87	kW
80° = .932 kW/Ton x 39 T	0.93	kW
85° = 1.007 kW/Ton x 39 T	1.01	kW
90° = 1.05 kW/Ton x 39 T	1.05	kW

kW per compressor at unloaded part load (@ 26 Tons)

75° = .875 kW/ton x 39T x .66	0.58	kW
80° = .932 kW/Ton x 39 T x .66	0.62	kW
85° = 1.007 kW/Ton x 39 T x .66	0.66	kW
90° = 1.05 kW/Ton x 39 T x .66	0.69	kW
Total full load hours (all compressors)	4,659	hrs.
Total partial load hours (all compressors)	1,947	hrs.
Total no load hours (all compressors)		hrs.

Total full load ton hours	186,368	t/hrs
Total partial load ton hours	50,632	t/hrs
Total ton hours	237,000	t/hrs

Total kWh consumed

North chilled water system	209,322	kWh
South chilled water system (identical system)	209,322	kWh
Total kWh used by North & South systems	<u>418,645</u>	kWh

30HXC 244 Chiller (cetrifigual)

New North chiller usage		
Hours/Month (12 Hours * 6 days * 4 wks)	288	hrs.

Total full load hours	23	hrs.
Total partial load hours	1,377	hrs.
Total no load hours	331	hrs.

Total full load ton hours	5,622	t/hrs
Total partial load ton hours	125,260	t/hrs
Total ton hours	130,882	t/hrs

North chilled water system	75,895	kWh
South chilled water system (identical system)	75,895	kWh
Total kWh used by North & South systems	<u>151,789</u>	kWh

kWh avoided	<u>266,856</u>	kWh
\$/kWh	\$0.09	
Total cost savings	\$24,017	

Chilled water pump savings**Reduced hours of operation**

Pump Hp (both North and South pumps 10 hp @	20	
Amps	27.4	
kW	21.8	kW
Existing hours (6 months)	2184	hrs.
kWh used	47,621.9	kWh
New hours (6 months)	1728	hrs.
kWh used	37,678.9	kWh
kWh avoided	<u>9,943.0</u>	
\$/kWh	\$0.09	
Total cost savings	\$895	

Variable Flow Pumping

Chilled Water Pump VFD (Acting as control valve)		
kWh used	37,678.9	kWh
Est Reduction	30%	
New kWh used	26,375.2	kWh
kWh avoided	<u>11,303.7</u>	kWh
\$/kWh	\$0.09	
Total cost savings	\$1,017.33	

Cooling tower savings**Reduced hours of operation**

Tower fan Hp (both North and South towers 15 l	30	
Amps	42.0	
kW	33.4	kW
Existing hours (6 months)	2184	hrs.
kWh used	72,997.1	kWh
New hours (6 months)	1728	hrs.
kWh used	57,756.0	kWh
kWh avoided	<u>15,241.2</u>	
\$/kWh	\$0.09	
Total cost savings	\$1,372	

BAS sequence optimization

Chilled Water Pump VFD (Acting as control valve)		
kWh used	57,756.0	kWh
Est Reduction	28%	
New kWh used	41,584.3	kWh
kWh avoided	<u>16,171.7</u>	kWh
\$/kWh	\$0.09	
Total cost savings	\$1,455.45	

Existing HR 195 chiller estimated energy usage

Estimate % of compressor operation

	CDD	Comp 1			Comp 2			Comp 3			Comp 4			Comp 5		
		Full (40T)	Partial (26 T)	Off	Full (40T)	Partial (26 T)	Off	Full (40T)	Partial (26 T)	Off	Full (40T)	Partial (26 T)	Off	Full (40T)	Partial (26 T)	Off
#####	13	45%	15%	40%	35%	15%	50%	30%	10%	60%	15%	10%	75%	0%	0%	100%
Jun-08	163	75%	25%	0%	65%	25%	10%	55%	25%	20%	30%	30%	40%	10%	15%	75%
Jul-08	222	95%	5%	0%	85%	15%	0%	65%	30%	5%	45%	45%	10%	15%	15%	70%
#####	139	95%	5%	0%	90%	10%	0%	70%	25%	5%	45%	45%	10%	15%	15%	70%
#####	74	75%	15%	10%	55%	15%	30%	35%	20%	45%	25%	15%	60%	10%	10%	80%
Oct-08	2	45%	15%	40%	35%	35%	30%	15%	15%	70%	0%	0%	100%	5%	15%	80%

Estimate hours of operation (% operation * hours per month)

	CDD	Comp 1			Comp 2			Comp 3			Comp 4			Comp 5		
		Full (40T)	Partial (26 T)	Off	Full (40T)	Partial (26 T)	Off	Full (40T)	Partial (26 T)	Off	Full (40T)	Partial (26 T)	Off	Full (40T)	Partial (26 T)	Off
#####	13	163.8	54.6	145.6	127.4	54.6	182	109.2	36.4	218.4	54.6	36.4	273	0	0	364
Jun-08	163	273	91	0	236.6	91	36.4	200.2	91	72.8	109.2	109.2	145.6	36.4	54.6	273
Jul-08	222	345.8	18.2	0	309.4	54.6	0	236.6	109.2	18.2	163.8	163.8	36.4	54.6	54.6	254.8
#####	139	345.8	18.2	0	327.6	36.4	0	254.8	91	18.2	163.8	163.8	36.4	54.6	54.6	254.8
#####	74	273	54.6	36.4	200.2	54.6	109.2	127.4	72.8	163.8	91	54.6	218.4	36.4	36.4	291.2
Oct-08	2	163.8	54.6	145.6	127.4	127.4	109.2	54.6	54.6	254.8	0	0	364	18.2	54.6	291.2
Total		1,565	291	328	1,329	419	437	983	455	746	582	528	1,074	200	255	1,729

	ENT	Comp 1			Comp 2			Comp 3			Comp 4			Comp 5		
		Full (40T)	Partial (26 T)	Off	Full (40T)	Partial (26 T)	Off	Full (40T)	Partial (26 T)	Off	Full (40T)	Partial (26 T)	Off	Full (40T)	Partial (26 T)	Off
#####	75	6,552	1,420	0	5,096	1,420	0	4,368	946	0	2,184	946	0	0	0	0
Jun-08	80	10,920	2,366	0	9,464	2,366	0	8,008	2,366	0	4,368	2,839	0	1,456	1,420	0
Jul-08	85	13,832	473	0	12,376	1,420	0	9,464	2,839	0	6,552	4,259	0	2,184	1,420	0
#####	90	13,832	473	0	13,104	946	0	10,192	2,366	0	6,552	4,259	0	2,184	1,420	0
#####	85	10,920	1,420	0	8,008	1,420	0	5,096	1,893	0	3,640	1,420	0	1,456	946	0
Oct-08	75	6,552	1,420	0	5,096	3,312	0	2,184	1,420	0	0	0	0	728	1,420	0
Total		62,608	7,571	0	53,144	10,884	0	39,312	11,830	0	23,296	13,723	0	8,008	6,625	0

Estimate kWh used by existing system (Hours x Tons x kW/ton)

	ENT	Comp 1			Comp 2			Comp 3			Comp 4			Comp 5		
		Full (40T)	Partial (26 T)	Off	Full (40T)	Partial (26 T)	Off	Full (40T)	Partial (26 T)	Off	Full (40T)	Partial (26 T)	Off	Full (40T)	Partial (26 T)	Off
#####	75	3,779	819	0	2,940	819	0	2,520	546	0	1,260	546	0	0	0	0
Jun-08	80	10,177	1,455	0	8,820	1,455	0	7,463	1,455	0	4,071	1,746	0	1,357	873	0
Jul-08	85	13,929	314	0	12,463	943	0	9,530	1,887	0	6,598	2,830	0	2,199	943	0
#####	90	14,524	314	0	13,759	629	0	10,702	1,572	0	6,880	2,830	0	2,293	943	0
#####	85	10,996	943	0	8,064	943	0	5,132	1,258	0	3,665	943	0	1,466	629	0
Oct-08	75	5,726	819	0	4,454	1,911	0	1,909	819	0	0	0	0	636	819	0
Total		59,132	4,666	0	50,500	6,701	0	37,255	7,538	0	22,474	8,897	0	7,952	4,208	0

New HXC246 chiller estimate energy usage

Estimate % operation at partial loads

	CDD	0%	25%	50%	75%	100%	
		offline					
#####	13	35%	45%	15%	5%	0%	100%
#####	163	15%	55%	25%	5%	0%	100%
Jul-08	222	5%	43%	45%	5%	3%	101%
#####	139	5%	25%	55%	10%	5%	100%
#####	74	15%	50%	30%	5%	0%	100%
#####	2	40%	55%	5%	0%	0%	100%

Estimate hours at partial loads

	CDD	0%	25%	50%	75%	100%	
		offline					
#####	13	100.8	129.6	43.2	14.4	0	301
#####	163	43.2	158.4	72	14.4	0	451
Jul-08	222	14.4	123.84	129.6	14.4	8.64	513
#####	139	14.4	72	158.4	28.8	14.4	427
#####	74	43.2	144	86.4	14.4	0	362
#####	2	115.2	158.4	14.4	0	0	290
Total		331	786	504	86	23	2,344

	CDD	0%	25%	50%	75%	100%	
		offline					
#####	13	0	7,906	5,270	2,635	0	15,811
#####	163	0	9,662	8,784	2,635	0	21,082
Jul-08	222	0	7,554	15,811	2,635	2,108	28,109
#####	139	0	4,392	19,325	5,270	3,514	32,501
#####	74	0	8,784	10,541	2,635	0	21,960
#####	2	0	9,662	1,757	0	0	11,419
Total		0	47,961	61,488	15,811	5,622	130,882

Estimate kWh used by new chiller

	CDD	.0 kw/ton	.523 kw/ton	0.586 kw/ton	0.646 kw/ton	.703 kw/ton	Total kWh
		offline					
#####	13	0	4,135	3,088	1,702	0	8,938
#####	163	0	5,053	5,147	1,702	0	12,066
Jul-08	222	0	3,951	9,265	1,702	1,482	16,623
#####	139	0	2,297	11,324	3,405	2,470	19,635
#####	74	0	4,594	6,177	1,702	0	12,547
#####	2	0	5,053	1,029	0	0	6,085
Total		0	25,083	36,032	10,214	3,952	75,895

Low Leakage Damper North and South**Kwh avoided** 31,504**Cooling Savings** **\$2,835.38**

Unit CFM (both units) 130,000

Estimate cooling occupied hours 1,731 (288 hrs./month/6 months)

Average indoor temp 72 °

Average indoor relative humidity 55%

Average indoor enthalpy 27 Btu/# of air

Average OA temp 79 °

Average outdoor relative humidity 68%

Average outdoor enthalpy 35 Btu/# of air

Outdoor enthalpy - indoor enthalpy 8 Btu/# of air

Minimum % 45.0% Verified with field measurements

New minimum % 10.0%

Leakage Diff 35.0%

CFM reduction 45,500

Cooling Btu saved per hour 364,000

Tons saved per hour 30

Tons saved per year 52507

Existing chiller kW/ton 0.6

kWh avoided 31,504

\$/kWh \$0.09

Total Savings \$2,835.38

2008 - 2009 Electric Usage Analysis
JoAnn Hudson Facility, Hudson, Ohio

2008 - 2009 Energy Utilization Intensity Analysis
JoAnn Hudson Facility, Hudson, Ohio

2008

Read Date	kWh	kVa	Cost	Unit Cost	HDD	CDD	DD Month	kWh/Sq.Ft.	\$/Sq.Ft.
Jan-08	1,233,710	4,844	\$94,415.78	\$0.08	1,128	0	Jan-08	0.9	\$0.07
Feb-08	1,170,143	4,746	\$91,848.84	\$0.08	1,119	0	Feb-08	0.9	\$0.07
Mar-08	1,205,749	4,673	\$94,085.52	\$0.08	972	0	Mar-08	0.9	\$0.07
Apr-08	1,113,902	4,700	\$91,820.25	\$0.08	392	3	Apr-08	0.8	\$0.07
May-08	1,189,422	5,105	\$98,833.35	\$0.08	304	13	#####	0.9	\$0.07
Jun-08	1,263,044	5,128	\$105,859.68	\$0.08	31	163	Jun-08	0.9	\$0.08
Jul-08	1,273,680	5,177	\$105,659.35	\$0.08	1	222	Jul-08	0.9	\$0.08
Aug-08	1,320,317	5,084	\$106,122.55	\$0.08	6	139	Aug-08	1.0	\$0.08
Sep-08	1,228,604	5,326	\$97,269.54	\$0.08	59	74	Sep-08	0.9	\$0.07
Oct-08	2,492,531	Gas u	\$197,335.54	\$0.08	446	2	Oct-08	1.9	\$0.15
Nov-08	1,171,039	4,703	\$94,742.35	\$0.08	792	0	Nov-08	0.9	\$0.07
Dec-08	1,299,306	4,789	\$99,605.52	\$0.08	1,065	0	Dec-08	1.0	\$0.07
Totals/Avg.	#####	54,274	\$1,277,598.27	\$0.08	6,315	616		1.0	\$0.08

2008

Month	Gas EUI	Electric EUI	Total EUI
Jan-08	8,013.8	3,129.0	#####
Feb-08	9,192.7	2,967.8	#####
Mar-08	3,720.4	3,058.1	6,778.4
Apr-08	2,230.0	2,825.1	5,055.1
May-08	773.8	3,016.7	3,790.5
Jun-08	274.3	3,203.4	3,477.7
Jul-08	125.6	3,230.4	3,356.0
Aug-08	47.6	3,348.6	3,396.2
Sep-08	217.1	3,116.0	3,333.1
Oct-08	1,302.3	6,321.6	7,624.0
Nov-08	3,285.5	2,970.0	6,255.5
Dec-08	7,960.3	3,295.3	#####
	#####	40,482.0	#####

2009

Read Date	kWh	kVa	Cost	Unit Cost	HDD	CDD	DD Month	kWh/Sq.Ft.	\$/Sq.Ft.
Jan-09	2,607,860	4,788	\$196,669.18	\$0.08	1,443	0	Jan-09	1.9	\$0.15
Feb-09	2,397,476	4,720	\$186,910.90	\$0.08	994	0	Feb-09	1.8	\$0.14
Mar-09	2,428,774	4,604	\$191,129.54	\$0.08	757	0	Mar-09	1.8	\$0.14
Apr-09	1,143,186	2,361	\$97,532.45	\$0.09	463	22	Apr-09	0.8	\$0.07
May-09	1,190,869	2,473	\$102,536.38	\$0.09	171	30	#####	0.9	\$0.08
Jul-09	1,252,691	5,090	\$112,995.69	\$0.09	8	106	Jul-09	0.9	\$0.08
Aug-09	1,219,957	5,105	\$23,515.32	\$0.02	16	187	Aug-09	0.9	\$0.02
Sep-09		5,326	\$98,008.32	\$0.08	79	46	Sep-09	0.9	\$0.07
Oct-09	1,238,856	1,228,604	\$97,071.66	\$0.08	487	0	Oct-09	0.9	\$0.07
Nov-09	1,199,596	2,281	\$94,357.44	\$0.08	577	0	Nov-09	0.9	\$0.07
Dec-09	1,240,218	2,293	\$97,286.32	\$0.08	1,099	0	Dec-09	0.9	\$0.07
Totals/Avg.	#####	1,267,646	\$1,298,013.20	\$0.08	6,094	391		1.2	\$0.09

2009

Month	Gas EUI	Electric EUI	Total EUI
Jan-09	8,412.3	6,614.2	#####
Feb-09	5,525.2	6,080.6	#####
Mar-09	3,171.8	6,159.9	9,331.7
Apr-09	3,307.8	2,899.4	6,207.2
May-09	198.5	3,020.3	3,218.8
Jul-09	55.0	3,177.1	3,232.1
Aug-09	198.5	3,094.1	3,292.6
Sep-09	1,627.9	3,116.0	4,743.9
Oct-09	2,263.4	3,142.0	5,405.5
Nov-09	3,478.8	3,042.5	6,521.2
Dec-09	6,254.4	3,145.5	9,399.9
	#####	43,491.6	#####

2008/2009 Average	15,940,466	660,960	\$1,287,805.73	\$0.08	6,205	504		1.1	\$0.08	2008/2009 Average	35,818.4	41,986.8	77,805.2
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RED indicates estimated data

EUI = Btu/Sq.Ft.

Existing Carrier HR 225 water cooled chiller
See 30 HD 3PD.PDF page 19 46° LWT 85° Entering condenser water temp.

Capacity 220 tons
kW 217.4

New chiller HXC246 water cooled chiller

ARI* capacity ratings



30HXC WATER-COOLED CHILLER ARI RATINGS (60 Hz ONLY)

UNIT SIZE 30HXC	CAPACITY		INPUT POWER (kW)	COOLER FLOW		COOLER PRESSURE DROP		CONDENSER FLOW		CONDENSER PRESSURE DROP		FULL-LOAD EFFICIENCY (kW/Ton)	IPLV† (kW/Ton)
	Tons	Output kW		GPM	L/s	Ft of Water	kPa	GPM	L/S	Ft of Water	kPa		
076	75.4	265.2	53.7	181.0	11.4	14.5	43.2	226.2	14.3	8.9	26.6	0.712	0.512
086	83.1	292.3	60.4	199.4	12.6	17.2	51.4	249.3	15.7	10.7	31.8	0.727	0.523
096	94.0	330.5	67.0	225.5	14.2	17.0	50.7	282.0	17.8	11.0	32.7	0.713	0.513
106	104.3	366.8	75.3	250.3	15.4	15.4	46.0	312.9	19.7	13.3	39.6	0.722	0.521
116	113.5	399.3	83.2	272.5	17.2	13.3	39.8	340.6	21.5	17.0	50.6	0.733	0.509
126	122.9	432.1	92.2	295.2	18.6	15.4	45.9	369.0	23.3	19.6	58.5	0.751	0.530
136	136.5	479.9	97.0	327.5	20.7	14.6	43.7	409.4	25.8	18.5	55.1	0.711	0.541
146	145.9	513.2	105.1	350.2	22.1	16.5	49.3	437.8	27.6	20.9	62.4	0.720	0.533
161	156.5	550.6	111.7	375.5	23.7	13.7	40.9	469.6	29.6	21.3	63.6	0.714	0.520
171	165.9	585.3	118.2	398.1	25.1	15.2	45.4	497.6	31.4	17.2	51.4	0.712	0.538
186	177.2	623.1	126.7	426.2	26.8	13.9	41.5	531.6	33.5	19.5	58.1	0.715	0.562
206	211.5	744.0	146.4	507.7	32.0	14.7	43.9	634.7	40.0	20.9	62.4	0.692	0.510
246	248.6	874.1	172.4	596.5	37.6	16.2	48.3	745.7	47.0	21.9	65.2	0.693	0.522
261	257.2	904.6	180.5	617.3	38.9	17.2	51.4	771.6	48.7	23.3	69.5	0.702	0.523
271	267.4	940.3	189.5	641.7	40.5	18.5	55.1	802.1	50.6	25.1	74.7	0.709	0.525

LEGEND

IPLV — Integrated Part-Load Value

*Air Conditioning and Refrigeration Institute (U.S.A.).

†IPLV shown is the lower of Sequence A or Sequence B unloading.

NOTES:

1. Rated (60 Hz only) in accordance with ARI Standard 550/590-2004 at standard rating conditions.
2. Standard rating conditions are as follows:
Cooler Conditions:
Leaving Water Temperature: 44 F (6.7 C)
Flow: 2.4 gpm per ton (0.043 L/s per kW)
Condenser Conditions:
Entering Water temperature: 85 F (29.4 C)
Flow: 3.0 gpm per ton (0.054 L/s per kW)
Fouling Factor (Cooler):
0.00010 hr x sq ft x F per Btuh (0.000018 m² x K per W)
Fouling Factor (Condenser):
0.00025 hr x sq ft x F per Btuh (0.000044 m² x K per W)

3. IPLV is a single number part-load efficiency value calculated using the efficiency values at 100%, 75%, 50%, and 25% of load when the chiller is operating at ARI conditions.
4. All data in this table is rated (60 Hz only) in accordance with ARI Standard 550/590-2004 as represented in the Chiller Selection Program (E-Cat) version 2.93.
5. Contact Carrier for custom ratings.



Rated in accordance with
ARI Standard 550/590-2004.

60 Hz only

AKRON, OH

Humidity
M=Morning
A=Afternoon

Jan		Feb		Mar		Apr		May		Jun		Jul		Aug		Sep		Oct		Nov		Dec		Annual	
M	A	M	A	M	A	M	A	M	A	M	A	M	A	M	A	M	A	M	A	M	A	M	A	M	A
79	69	78	65	77	60	75	54	77	55	80	56	84	56	88	58	87	60	82	58	79	65	79	70	80	61

Average

74 72 69 65 66 68 70 73 74 70 72 75 71

Temperature
L=Low
H=High

Jan		Feb		Mar		Apr		May		Jun		Jul		Aug		Sep		Oct		Nov		Dec		Annual	
L	H	L	H	L	H	L	H	L	H	L	H	L	H	L	H	L	H	L	H	L	H	L	H	L	H
19	33	21	36	28	46	59	67	48	69	57	78	61	82	61	80	53	73	42	61	34	49	24	37	42	59

26 29 37 63 59 68 72 71 63 52 42 31 51

JoAnn Hudson Corporate Offices
Dual Duct VAV Conversion Project (North Penthouse)
2/4/2014

Phase 1 FE Rebate Information

	kWh per box	Boxes replaced
		39
Existing kWh	3,504	136,655
New kWh	1,337	52,126
Avoided kWh	1,856	72,401

JoAnn Hudson Corporate Offices
Dual Duct Replacement Project
2/4/2014

This is a multi-phase project designed to replace the existing Conner pneumatically controlled dual duct mixing boxes. Conditioned air is supplied to the 193 existing boxes by constant volume air handling units located in the North and South Penthouse mechanical rooms. Each unit supplies approximately ½ of the existing boxes.

These boxes, installed in the early 1960's, have been slowly degrading. Repair parts for the boxes are not available, thus when a box begins to fail the box controls have to be "gamed" in order provide a modicum of comfort control. We have also had to modify the operation of the air handling unit to prevent overheating in the winter and over cooling in the summer. These solutions are not energy efficient and were one of the reasons JoAnn's undertook the replacement program.

The replacement is scheduled for four phases, each addresses a specific area. The first stage replaced 39 "old" boxes with 45 new DDC controlled boxes. The box sequences allow for remote set point control and sectional "group" occupancy control.

Additional boxes were added to address the current office usage patterns and optimize the group scheduling feature.

AHU-1 Total Savings (99 original boxes)

Combined Supply and Return Exhaust Fan Savings \$16,541

Convert Existing Dual Duct System to Dual Duct VAV

Hours

Occupied hours M-F (52 wks x 6 days X 14 hours)	4,368
Occupied hours Sat (52 wks x 1 days X 6 hours)	312
Total Occupied Hours	4,680

Supply Fan Speed Reductions

Constant Volume

Supply Fan Horsepower	75	
Amps	69.0	
kW	54.9	kW
Existing hours	4,680	hrs.
kWh used	256,980	kWh

Variable Volume (reduced speed)

		Hours	kW @ % Red.	kW Used
Hours of Operation		4,680	54.9	
% time at 100% speed	0%	0	54.9	0
% time at 90% speed	5%	234	49.4	11,562
% time at 80% speed	10%	468	43.9	20,555
% time at 70% speed	15%	702	38.4	26,978
% time at 60% speed	20%	936	32.9	30,832
% time at 50% speed	35%	1,638	27.5	44,963
% time at 40% speed	10%	468	11.0	5,139
% time at 30% speed	5%	234	16.5	3,854

100%

Constant Volume Fan kWh	256,980
Variable Volume Fan kWh	143,882 kWh
kWh avoided	113,098 kWh
\$/kW	0.09
Savings	\$10,179

Return Exhaust Fan Speed Reductions

Constant Volume

Return Exhaust Fan Horsepower	15	
Amps	11.1	
kW	8.8	kW
Existing hours	10,179	hrs.
kWh used	89,913	kWh

Variable Volume (reduced speed)

		Hours	kW @ % Red.	kW Used
Hours of Operation		4,680	8.8	
% time at 100% speed	0%	0	8.8	0
% time at 90% speed	5%	234	8.0	1,860
% time at 80% speed	5%	234	7.1	1,654
% time at 70% speed	10%	468	6.2	2,894
% time at 60% speed	15%	702	5.3	3,721
% time at 50% speed	35%	1,638	4.4	7,235
% time at 40% speed	15%	702	1.8	1,240
% time at 30% speed	5%	234	2.7	620
% time at 0% speed	10%	468	0.0	0
	100%			
Constant Volume Fan kWh		89,913		
Variable Volume Fan kWh		19,223 kWh		
kWh avoided		70,690 kWh		
\$/kW		\$0.09		
Savings		\$6,362		

FE Rebate Calc

		Existing	New	Avoided
Supply and Return Exh. Fan kWh per AHU	kWh	346,893	132,321	183,788
	No. of Boxes			
kWh Per Box	99	3,504	1,337	1,856
Replaced	39	136,655	52,126	72,401

JoAnn Hudson Penthouse Upgrades
Modified Schedule of Values
2/4/2014

Penthouse Upgrades			Costs associated with energy improvements	
#	Description of Item	Scheduled Value	Applicable %	Value
1	General Conditions	\$ 14,500.00	50%	\$ 7,250.00
2	Engineering	\$ 16,400.00	65%	\$ 10,660.00
3	Mobilization	\$ 22,000.00	50%	\$ 11,000.00
4	Demolition	\$ 32,000.00	60%	\$ 19,200.00
5	Chiller	\$ 136,890.00	100%	\$ 136,890.00
6	Boilers	\$ 47,750.00	0%	\$ -
7	Misc. Equipment	\$ 46,500.00	35%	\$ 16,275.00
8	Install Equipment	\$ 24,750.00	60%	\$ 14,850.00
9	Crane & Rigging	\$ 24,500.00	85%	\$ 20,825.00
10	Piping Material	\$ 37,856.00	45%	\$ 17,035.20
11	Piping Labor	\$ 38,500.00	35%	\$ 13,475.00
12	Piping Equipment	\$ 26,500.00	35%	\$ 9,275.00
13	Sheetmetal Material	\$ 3,500.00	90%	\$ 3,150.00
14	Sheetmetal Labor	\$ 8,000.00	85%	\$ 6,800.00
15	Controls	\$ 56,423.00	85%	\$ 47,959.55
20	Testing & Balancing	\$ 2,500.00	35%	\$ 875.00
Total		\$ 538,569.00		\$ 335,519.75

JoAnn Hudson Print Shop Renovations
Modified Schedule of Values
2/4/2014

Print Shop Renovation			Costs associated with energy improvements	
#	Description of Item	Scheduled Value	Applicable %	Value
1	General Conditions	\$ 8,500.00	50%	\$ 4,250.00
2	Engineering	\$ 17,500.00	65%	\$ 11,375.00
3	Mobilization	\$ 15,750.00	50%	\$ 7,875.00
4	Drafting	\$ 3,500.00	75%	\$ 2,625.00
5	N Penthouse Heating Water Piping	\$ 19,750.00	0%	\$ -
6	Demolition	\$ 7,500.00	100%	\$ 7,500.00
7	Chillers	\$ 27,600.00	100%	\$ 27,600.00
8	Air Handling Units	\$ 10,200.00	65%	\$ 6,630.00
9	Miscellaneous Equipment	\$ 31,000.00	50%	\$ 15,500.00
10	Install Equipment	\$ 7,500.00	65%	\$ 4,875.00
11	Crane & Rigging	\$ 5,000.00	75%	\$ 3,750.00
12	Piping Material	\$ 22,000.00	65%	\$ 14,300.00
13	Piping Labor	\$ 22,000.00	75%	\$ 16,500.00
14	Piping Equipment	\$ 24,000.00	75%	\$ 18,000.00
15	Sheetmetal Material	\$ 17,200.00	65%	\$ 11,180.00
16	Sheetmetal Labor	\$ 32,500.00	65%	\$ 21,125.00
17	Mechanical Insulation	\$ 6,544.00	45%	\$ 2,944.80
18	Controls	\$ 56,534.00	85%	\$ 48,053.90
19	Roofing	\$ 7,500.00	100%	\$ 7,500.00
20	Testing & Balancing	\$ 2,500.00	85%	\$ 2,125.00
Total		\$ 344,578.00		\$ 233,708.70

JoAnn Hudson Print Shop Renovation
Hudson, Ohio
FE Rebate Information
2/4/2013

	Old	New	Avoided
AC Efficiency	152,719	108,452	44,267
Exhaust Fan	49,942	0	49,942
Outside air reduction	104,894	16,991	87,903
<u>Totals</u>	<u>307,555</u>	<u>125,444</u>	<u>182,112</u>

JoAnn Hudson Chiller Replacement Project

Hudson, Ohio

The existing air handling unit is a Trane split system climate changer, RA250 condenser and a BH300 fan coil unit, circa 1959. The condenser is fitted with a single R22 hermetic compressor, with unloaders and is rated at 25 tons. The fan coil unit is rated at 11,000 cfm and was delivered with a 5 hp motor, which since has been replaced with a 10 hp high efficiency motor. The system was originally used to condition a fuel testing lab, but has been retrofitted to condition a print shop.

It should be noted that the existing unit outdoor air dampers were broken and held in a fixed 45% open position. In addition, due to the former usage as a fuel testing lab, an exhaust system operated 24/7 exhausting conditioned air to the outdoors.

As part of this renovation project, a 1,830 sq. ft. addition was added to the conditioned area, additional equipment was added and specific area temperature and humidity requirements were dictated. Our load estimates determined that the existing 25 ton air handler was marginally able to maintain the existing area. The added square footage, the additional equipment, and the specified temperature and humidity requirements required additional cooling capacity.

The new load was determined to be approximately 42 tons. A 50 ton Carrier Aqua Snap air cooled chiller was selected to supply the mechanical refrigeration needs of the new system. The selection of a chiller versus a D.X. system was based on the ability of the chilled water system to provide infinite capacity control, allowing the application of a zoned VAV system. In addition, the chiller kW per ton at part loads was superior to the existing system.

The new system will correct the outdoor damper and exhaust system problems noted above. The building automation system will control the new system providing reduced operation and sharper control.

As to the energy savings estimate. We chose to evaluate the savings compared to the existing 25 ton system. This gave a representation of the actual energy savings, rather than modeled savings based on a supposed 1959 50 tons system. Thus, for the rebate calculations, all the calculations are based on the premise that we are installing a 25 ton replacement system base on the new criteria. The existing system was de-rated to 20 tons based on field measurements.

The existing Print Room electric duct heaters, installed after the gas duct heaters failed, were eliminated. We also eliminated the electric reheats used for the Print Shop Offices. The new air handling units are equipped with hot water coils supplied by a high efficiency hot water boiler system.

\$ Saved

kWh Saved

Estimated Print Shop Energy Savings

	Savings	kWh Avoided
A/C efficiency savings	\$ 3,541	44,267
Exhaust Fan Savings	\$ 3,995	49,942
Eliminate Print Room Electric Heat Savings	\$ 5,155	64,441
Min OA Savings	\$ 11,404	142,549
Total Annual	\$ 24,096	301,199

A/C efficiency savings

Existing equipment

Indoor air handling unit, D.X. with outdoor condensing unit

RA2504 Comp. 25.2 kW 3 Cond, Fan @ 2.7 kW each

full load unit tons (See Note 1)	20
part load unit tons	15
full load existing EER	7.2
part load existing EER	11.5

Replacement equipment

full load unit tons (See Note 2)	20
part load unit tons	15
full load Chiller EER (See note 3)	10.3
part load Chiller EER (See note 3)	15.3

Estimate cooling hours

cooling hours	5,630
full load %	65%
part load %	35%

hours at full load	3,660
hours at part load	1,971

full load existing system kW/ton	1.67
part load existing system kW/ton	1.04
full load new system kW/ton	1.17
part load new system kW/ton	0.78

full load existing system kW/ton x tons	33.3
part load existing system kW/ton x tons	15.7
full load new system kW/ton x tons	23.3
part load new system kW/ton x tons	11.8

full load existing system kW/ton x tons x hrs. per year	121,861.35
part load existing system kW/ton x tons x hrs. per year	30,858.03
full load new system kW/ton x tons x hrs. per year	85,269.90
part load new system kW/ton x tons x hrs. per year	23,182.35

existing system total kWh per year	152,719.38
new system total kWh per year	108,452.26

<u>kWh avoided</u>	44,267.12
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\$/kw	\$ 0.08
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existing cost	\$ 12,218
new cost	\$ 8,676

Total AC Savings \$ 3,541

Note 1 : Unit age and condition has reduced output capacity, kW has remained constant

$$\text{EER} = (20\text{T}/12)/(25.2\text{ kW} + 8.1\text{ kW} = 33.3\text{ kW})$$

Note 2 : New system capacity matched to existing system capacity 30RAP 025

Note 3 : Carrier Aqua Snap product data sheet; page 4, AHRI Capacity Rating (30RAP 025)

Exhaust Fan Savings**Exhaust fan (eliminated)**

existing fan hp	1
voltage (3 phase)	460
amps	2
efficiency	0.87
power factor	0.9
$kW = (\text{amps} \times \text{volts} \times \text{eff} \times \text{pf}) / 1000$	0.72
hours of operation	8,760
kWh avoided per year	6,310

A/C (eliminated cooling load)

exhaust fan cfm	1,500
cooling hours	5,630
summer delta (Indoor - Average outdoor temps)	15
sensible tons	11,401
Tons at full load	7,410
Tons at part load	3,990
kWh per ton	
Existing full load kWh/ton	1.67
Existing part load kWh/ton	1.04
kWh used	
Full load kWh	12,338
Part load kWh	4,166
kWh saved	16,504

Electric Heat

exhaust fan cfm	1,500
heating hours	3,130
Winter Delta T (Room - Average winter OA temp.)	45
kWh at full load	66,875
Interior Load Factor	50%
kWh avoided	33,437

total kWh avoided	49,942
\$/kW	\$ 0.08

Total Exhaust Fan Savings \$ 3,995.34

Eliminate Print Room Electric Heat Savings

Heaters replaced with hot water coils (gas boilers)

Electric duct heaters

heating hours	3,130
full load %	35%
hours at full load	1,096
Full load output (mbh)	200
kW heating (per hour)	58.8
kWh used	64,441
\$/kW	\$ 0.08

Total electric heat savings \$ 5,155

Outdoor Air Minimum Red.**Existing Winter Heating**

Unit CFM	11,000
Winter Hours	3,130
Weeks	18.6
Weekday after hours (Presses off = 8 hrs.)	149
Weekend hours (Presses off = 48 hrs.)	894
% of hours requiring heating	60%
Hours of heating	537
Winter Delta T (Room - Average winter OA temp.)	45
Sensible Winter	286,851,086
% electric heat	65%
Electric Heat Btu	186,453,205.71
Btu/kWh	3,412
kWh avoided	54,646

Existing Summer Cooling (sensible)

Unit CFM	11,000
Existing Minimum %	40%
Minimum CFM	4,400
Summer Hours	5,630
Cooling Hours (60%)	3,378
Delta H	13
Sensible Tons	72,458
Tons at full load	47,098
Tons at part load	25,360
kWh per ton	
Existing full load kWh/ton	1.67
Existing part load kWh/ton	1.04
kWh used	
Full load kWh	78,418
Part load kWh	26,476
kWh used	104,894

New Summer Cooling (sensible)

Unit CFM	10,000
New Minimum % (CO2 monitoring system)	10%
Minimum CFM	1,000
Summer Hours	5,630
Cooling Hours (60%)	3,378
Delta H	13
Sensible Tons	16,468
Tons at full load	10,704
Tons at part load	5,764
kWh per ton	
Existing full load kWh/ton	1.17
Existing part load kWh/ton	0.78
kWh used	
Full load kWh	12,471
Part load kWh	4,521
kWh used	16,991

Winter heating kWh avoided (converted to hot water heat)	54,646
Summer cooling kWh avoided	87,903

Total Min. OA Avoided kWh	142,549
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\$/kW	\$	0.08
Total Min. Oa Savings	\$	11,404

Table 4—Fan Motor Service Ratings

NOMINAL HP SIZE	MAX. AMP. TEMP.	1/2	3/4	1	1 1/4	2	3	5	7 1/2	10
100F	100F	6	1.1	1.25	1.7	2.3	3.45	5.75	8.60	11.5
150F	150F	7	1.0	1.1	1.5	2.0	3.00	5.00	7.50	10.0
130F	130F	6	.85	.85	1.25	1.7	2.55	4.25	6.50	8.5

SERVICE RATINGS APPLICABLE TO THE VALUES LISTED IN TABLE 3.

Table 5—Electrical Characteristics of Standard Motor Sizes

COMPRESSION MOTORS									
MODEL	NO. OF PHASES	VOLTS	CYC.	PH.	AMPS		KW INPUT		
RA2003	1	208, 220	60	3	72	270	20.0		
RA2004	1	240	60	3	16	145	50.0		
RA2503	1	208, 220	60	3	39	25.2			
RA2504	1	240	60	3	44	102	25.2		
RA3003	1	208, 220	60	3	100	435	30.3		
RA3004	1	240	60	3	53	218	30.3		
RA4003	1	208, 220	60	3	149	560	40.1		
RA4004	1	240	60	3	75	250	40.1		
RA5003	1	208, 220	60	3	171	717	50.2		
RA5004	1	240	60	3	85	359	50.2		

CONDENSER FAN MOTORS									
MODEL	HP	RPM	VOLTS	CYC.	PH.	AMPS		KW INPUT	
RA2003	2	1750	220	60	3	6.4	42.5	1.8	
RA2004	2	1750	440	60	3	3.2	21.5	1.8	
RA2503	3	1750	220	60	3	0.0	57	2.7	
RA2504	3	1750	440	60	3	4.9	29	2.7	
RA3003	3	1750	220	60	3	8.6	59	2.7	
RA3004	3	1750	440	60	3	4.3	29	2.7	
RA4003	5	1750	220	60	3	13.4	90	4.6	
RA4004	5	1750	440	60	3	6.7	43	4.6	
RA5003	5	1750	220	60	3	13.4	90	4.6	
RA5004	5	1750	440	60	3	6.7	43	4.6	

COOLING UNIT FAN MOTORS									
MODEL	HP	RPM	VOLTS	CYC.	PH.	AMPS		KW INPUT	
RA2003	3	3450	208/220/440	60	3	7.3/3.7	52/28	2.4	
RA2503	5	3450	208/220/440	60	3	12.8/6.4	90/49	4.8	
RA3003	5	3450	208/220/440	60	3	12.8/6.4	90/49	4.8	
RA4003	7 1/2	3450	208/220/440	60	3	20/10	120/60	6.5	
RA5003	7 1/2	3450	208/220/440	60	3	20/10	120/60	6.5	

RATINGS CONDITIONS: 80 DB, 67 WB, 55 AMBIENT WITH MATCHING BK EVAPORATOR UNIT

NOTE: F.L.—FULL LOAD
L.R.—LOCKED ROTOR

AHRI* capacity ratings



UNIT 30RAP	CAPACITY		COMPRESSOR POWER INPUT (kW)	FAN POWER (kW)	TOTAL POWER (kW)	FULL LOAD		IPLV		COOLER FLOW RATE		COOLER WATER PRESSURE DROP	
	Tons	kW				EER	COP	EER	COP	GPM	L/s	ft wg	kPa
010	10.5	36.8	10.7	1.2	12.0	10.5	3.1	14.2	4.2	25.1	1.6	13.7	40.9
015	14.0	49.2	15.6	1.3	16.8	10.0	2.9	13.2	3.9	33.5	2.1	15.7	46.8
018	16.1	56.6	15.6	3.0	18.6	10.4	3.0	14.5	4.2	38.6	2.4	15.6	46.5
020	18.8	66.1	19.1	2.9	21.9	10.3	3.0	14.5	4.2	45.2	2.9	14.2	42.4
025	23.4	82.3	24.5	2.8	27.4	10.3	3.0	15.3	4.5	56.3	3.6	17.8	53.1
030	27.6	97.1	30.9	2.7	33.6	9.9	2.9	14.8	4.3	66.3	4.2	20.9	62.3
035	34.4	121.0	35.9	3.8	39.7	10.4	3.0	14.9	4.4	82.5	5.2	13.2	39.4
040	38.9	136.8	42.3	3.8	46.1	10.1	3.0	15.3	4.5	93.4	5.9	13.8	41.2
045	43.1	151.6	48.6	3.4	52.0	10.0	2.9	15.3	4.5	103.4	6.5	15.3	45.6
050	47.3	166.3	53.1	3.8	57.0	10.0	2.9	14.7	4.3	113.5	7.2	19.1	57.0
055	51.8	182.2	58.4	5.3	61.7	10.1	3.0	14.6	4.3	124.2	7.8	17.6	52.5
060	56.0	196.9	60.8	5.3	66.2	10.2	3.0	14.5	4.2	134.4	8.5	20.5	61.2
070	68.9	242.3	74.6	6.8	81.4	10.2	3.0	15.2	4.5	165.2	10.4	19.5	59.4
080	77.4	272.2	83.2	6.7	89.9	10.3	3.0	15.5	4.5	185.9	11.7	21.2	52.5
090	84.0	295.4	91.0	6.8	97.8	10.3	3.0	15.9	4.7	201.7	12.7	22.7	65.6

LEGEND
COP—Coefficient of Performance
EER—Energy Efficiency Ratio
IPLV—Integrated Part Load Value

* Air Conditioning, Heating, and Refrigeration Institute.
NOTE: Based on AHRI-550/590 standard rating conditions. Ratings are for standard chillers only. Ratings do not include options.



UNIT 30	UNIT SIZE	LCWT (F)	CONDENSER ENTERING WATER TEMPERATURE (F)															
			75.0				80.0				85.0				90.0			
			Cap. (Tons)	Input kW	Cooler Flow Rate (Gpm)	Cond Flow Rate (Gpm)	Cap. (Tons)	Input kW	Cooler Flow Rate (Gpm)	Cond Flow Rate (Gpm)	Cap. (Tons)	Input kW	Cooler Flow Rate (Gpm)	Cond Flow Rate (Gpm)	Cap. (Tons)	Input kW	Cooler Flow Rate (Gpm)	Cond Flow Rate (Gpm)
HK	015	40.0	15.3	12.1	36.7	44.5	14.9	12.8	35.7	44.0	14.5	13.6	34.7	43.5	14.1	14.3	33.7	43.0
	020		19.7	15.2	47.2	57.0	19.1	15.9	45.7	56.1	18.5	16.6	44.3	55.1	17.9	17.3	42.8	54.1
	025		26.7	20.8	63.9	77.3	25.9	21.7	61.9	76.0	25.1	22.7	60.0	74.7	24.2	23.6	58.0	73.4
	030		28.7	23.7	68.7	84.0	27.9	24.8	66.9	82.9	27.2	25.8	65.0	81.8	26.4	26.8	63.1	80.5
	040		39.9	30.6	95.5	115.3	38.7	32.1	92.6	113.4	37.5	33.5	89.7	111.4	36.2	34.9	86.7	109.4
	050		48.8	39.0	116.8	142.0	47.4	40.8	113.4	139.8	45.9	42.5	109.9	137.5	44.4	44.2	106.3	135.0
	060		56.7	47.3	135.8	166.2	55.1	49.3	132.0	163.9	53.5	51.4	128.1	161.4	51.9	53.3	124.3	158.9
HR	070	40.0	67.6	53.9	161.9	196.7	65.7	56.4	157.2	193.7	63.7	58.8	152.4	190.5	61.7	61.1	147.6	187.3
	080		75.3	61.5	180.2	219.9	73.2	64.3	175.3	216.8	71.1	67.0	170.2	213.6	68.9	69.6	165.0	210.2
	090		83.3	69.5	199.3	244.2	81.0	72.6	194.0	240.9	78.8	75.6	188.6	237.6	76.5	78.4	183.0	233.9
	100		95.8	76.5	229.4	278.8	93.3	80.2	223.4	275.3	90.8	83.7	217.4	271.7	88.2	87.1	211.2	267.9
	110		102.7	84.3	246.0	300.3	100.1	88.1	239.7	296.7	97.5	91.9	233.4	293.0	94.8	95.6	227.0	289.1
	120		109.6	91.9	262.4	321.7	106.9	96.1	255.9	318.0	104.2	100.0	249.6	314.4	101.4	103.9	242.8	310.2
	140		131.9	113.5	315.8	388.9	128.4	118.2	307.5	383.8	125.0	122.7	299.2	378.6	121.5	127.1	290.7	373.2
	160		146.3	127.9	350.1	432.4	142.5	132.8	341.2	426.9	138.8	137.7	332.3	421.3	135.1	142.3	323.3	415.6
	195		177.8	162.7	425.6	534.7	173.0	168.5	414.2	527.5	168.3	174.2	402.8	520.1	163.4	179.7	391.1	512.5
	225		208.5	194.1	499.0	629.1	202.9	201.0	485.8	620.8	197.3	207.7	472.4	612.3	191.9	214.0	459.4	603.8
HK	015	42.0	15.9	12.1	38.2	46.0	15.5	12.9	37.2	45.5	15.1	13.7	36.1	45.0	14.7	14.4	35.1	44.5
	020		20.5	15.4	49.2	59.1	19.9	16.1	47.7	58.1	19.3	16.8	46.2	57.1	18.6	17.6	44.7	56.1
	025		27.8	21.0	66.5	80.0	26.9	22.0	64.5	78.7	26.1	23.0	62.5	77.4	25.3	23.9	60.6	76.1
	030		29.8	24.0	71.5	86.9	29.0	25.1	69.6	85.8	28.3	26.2	67.7	84.6	27.4	27.2	65.8	83.4
	040		41.6	30.8	99.6	119.5	40.3	32.4	96.6	117.6	39.1	33.9	93.6	115.6	37.8	35.3	90.5	113.5
	050		50.8	39.3	121.8	147.2	49.4	41.2	118.3	144.9	47.9	43.0	114.7	142.6	46.4	44.8	111.0	140.1
	060		59.0	47.7	141.4	172.1	57.4	49.9	137.5	169.7	55.8	52.0	133.6	167.2	54.1	54.0	129.6	164.6
HR	070	42.0	70.5	54.4	168.9	203.9	68.5	57.0	164.1	200.9	66.5	59.5	159.2	197.7	64.4	61.9	154.3	194.5
	080		78.4	62.2	187.8	227.8	76.3	65.0	182.7	224.7	74.1	67.8	177.5	221.4	71.9	70.5	172.2	218.0
	090		86.6	70.2	207.6	252.7	84.4	73.4	202.1	249.5	82.1	76.5	196.6	246.1	79.7	79.5	190.9	242.5
	100		99.4	77.2	238.2	287.9	96.9	80.9	232.2	284.5	94.3	84.6	225.8	280.6	91.7	88.1	219.6	276.8
	110		106.6	85.0	255.3	310.0	103.9	89.0	248.8	306.2	101.2	92.9	242.4	302.5	98.5	96.7	235.9	298.6
	120		113.6	92.8	272.0	331.7	110.8	97.0	265.5	328.0	108.1	101.2	259.0	324.4	105.2	105.3	251.9	320.1
	140		137.0	114.8	328.3	402.1	133.5	119.7	319.8	396.9	129.9	124.4	311.2	391.6	126.3	129.0	302.6	386.2
	160		151.9	129.4	363.9	447.0	148.1	134.6	354.8	441.5	144.3	139.6	345.6	435.8	140.4	144.5	336.4	430.0
	195		184.4	164.9	441.9	552.2	179.5	171.0	430.1	544.8	174.7	176.9	418.4	537.3	169.7	182.6	406.6	529.7
	225		216.1	196.8	517.7	649.3	210.5	204.0	504.3	641.0	204.8	210.9	490.7	632.5	199.1	217.7	477.0	623.7
HK	015	44.0	16.6	12.2	39.7	47.6	16.1	13.0	38.7	47.1	15.7	13.8	37.6	46.5	15.3	14.6	36.6	46.0
	020		21.4	15.5	51.2	61.1	20.7	16.3	49.7	60.2	20.1	17.0	48.2	59.2	19.5	17.8	46.6	58.1
	025		28.9	21.1	69.4	83.0	28.0	22.2	67.2	81.5	27.2	23.2	65.2	80.2	26.3	24.2	63.1	78.8
	030		31.0	24.2	74.3	89.9	30.2	25.3	72.3	88.7	29.4	26.5	70.4	87.5	28.5	27.5	68.4	86.3
	040		43.3	31.1	103.7	123.7	42.0	32.7	100.7	121.8	40.7	34.2	97.6	119.8	39.4	35.8	94.5	117.7
	050		52.9	39.7	126.9	152.4	51.4	41.6	123.3	150.1	49.9	43.5	119.7	147.8	48.3	45.4	115.9	145.3
	060		61.4	48.2	147.1	178.0	59.7	50.4	143.1	175.6	58.0	52.6	139.1	173.1	56.4	54.7	135.1	170.5
HR	070	44.0	73.5	54.9	176.1	211.4	71.4	57.6	171.1	208.2	69.3	60.2	166.1	205.1	67.2	62.8	161.0	201.7
	080		81.5	62.7	195.5	235.8	79.4	65.7	190.4	232.7	77.2	68.7	185.0	229.3	74.9	71.5	179.7	225.9
	090		90.1	70.9	215.9	261.4	87.8	74.2	210.4	258.2	85.4	77.4	204.8	254.8	83.0	80.6	199.0	251.2
	100		103.1	77.9	247.1	297.1	100.5	81.7	240.9	293.6	97.9	85.5	234.7	289.9	95.2	89.1	228.2	285.9
	110		110.4	85.7	264.6	319.6	107.7	89.9	258.2	316.0	104.9	93.9	251.5	312.1	102.2	97.9	244.9	308.3
	120		117.6	93.6	281.8	341.9	114.9	98.0	275.3	338.4	111.9	102.3	268.4	334.4	109.1	106.5	261.5	330.5
	140		142.3	116.0	341.1	415.5	138.6	121.1	332.4	410.2	135.0	126.0	323.6	404.9	131.3	130.8	314.8	399.4
	160		157.7	130.9	378.0	461.9	153.8	136.4	368.6	456.2	149.8	141.6	359.2	450.5	145.9	146.6	349.8	444.6
	195		191.2	167.2	458.4	570.0	186.2	173.5	446.4	562.5	181.2	179.6	434.3	554.9	176.2	185.6	422.3	547.2
	225		224.1	199.6	537.2	670.3	218.2	207.0	523.0	661.5	212.4	214.2	509.1	652.8	206.5	221.3	495.0	643.8
HK	015	46.0	17.2	12.3	41.3	49.1	16.8	13.1	40.2	48.6	16.3	13.9	39.1	48.1	15.9	14.7	38.1	47.6
	020		22.2	15.6	53.3	63.3	21.6	16.4	51.7	62.3	20.9	17.2	50.2	61.3	20.3	18.0	48.6	60.2
	025		30.1	21.3	72.2	85.8	29.2	22.4	69.9	84.4	28.3	23.5	67.8	83.0	27.4	24.5	65.7	81.6
	030		32.2	24.4	77.2	92.8	31.3	25.6	75.2	91.6	30.5	26.8	73.2	90.4	29.7	27.9	71.2	89.2
	040		45.0	31.3	107.9	128.0	43.7	33.0	104.8	126.1	42.4	34.6	101.7	124.0	41.1	36.2	98.5	121.9
	050		55.1	40.0	132.1	157.7	53.5	42.0	128.4	155.4	52.0	44.0	124.7	153.1	50.4	45.9	120.9	150.6
	060		63.8	48.6	152.9	184.0	62.1	51.0	148.9	181.6	60.4	53.2	144.8	179.1	58.6	55.4	140.7	176.5
HR	070	46.0	76.4	55.4	183.3	218.8	74.4	58.2	178.4	215.9	72.2	60.9	173.3	212.6	70.1	63.6	168.0	209.2
	080		84.8	63.2	203.4	243.9	82.6	66.4	198.1	240.7	80.4	69.4	192.8	237.5	78.1	72.4	187.2	234.0
	090		93.6	71.5	224.5	270.3	91.3	74.9	218.9	267.0	88.8	78.4	213.1	263.6	86.4	81.6	207.3	260.0
	100		106.8	78.3	256.1	306.3	104.2	82.4	249.9	302.8	101.5	86.3	243.5	299.1	98.8	90.1	236.9	295.2
	110		114.3	86.3	274.1	329.4	111.6	90.6	267.6	325.8	108.8	94.8	260.9	322.1	106.0	98.9	254.2	318.1
	120		121.7	94.4	291.9	352.3	118.8	98.9	285.0	348.5	116.0	103.4	278.3	344.8	113.0	107.7	271.1	340.7
	140		147.6	117.2	354.1	429.1	143.9	122.5	345.2	423.8	140.2	127.6	336.2	418.4	136.4	132.6	327.2	412.8
	160		163.6	132.4	392.4	477.1	159.6	138.0	382.8	471.3	155.6	143.5	373.2	465.5	151.5	148.7	363.5	459.5
	195		198.2	169.3	475.3	588.1	193.0	175.9	463.0	580.5	187.9	182.3	450.6	572.8	182.7	188.5		



Ohio Edison • The Illuminating Company • Toledo Edison

Mercantile Customer Program - Custom Project Rebate Calculator

Project Name and Number:	Chiller,Tower,Controls VFD upgrade
Site Name:	JoAnn Fabrics
Completed by (Name):	Joe Cindric
Date completed:	2/4/2014

Energy Conservation Measure	Annual Energy Savings kWh	Eligible Prescriptive Rebate Amount kWh * \$0.08
Chiller,Tower,Controls,VFD upgrade #1	351,019	28081.52
Print Shop Renovation- project #2	182,112	14568.96
Dual Duct VAV Conversion-project #3	72,401	5792.08
Total Project Energy Savings kWh	605,532	
Total Custom Prescriptive Rebate Amount \$		\$ 48,442.56

Notes about this rebate calculation:
See attached Chiller,Tower,Controls & VFD upgrade Calcs; Print Shop Renovation: Dual Duct VAV Conversion

Mercantile Customer Project Commitment Agreement
Cash Rebate Option

THIS MERCANTILE CUSTOMER PROJECT COMMITMENT AGREEMENT ("Agreement") is made and entered into by and between Ohio Edison Company, its successors and assigns (hereinafter called the "Company") and Jo-Ann Stores Inc, Taxpayer ID No. 34-0720629 its permitted successors and assigns (hereinafter called the "Customer") (collectively the "Parties" or individually the "Party") and is effective on the date last executed by the Parties as indicated below.

WITNESSETH

WHEREAS, the Company is an electric distribution utility and electric light company, as both of these terms are defined in R.C. § 4928.01(A); and

WHEREAS, Customer is a mercantile customer, as that term is defined in R.C. § 4928.01(A)(19), doing business within the Company's certified service territory; and

WHEREAS, R.C. § 4928.66 (the "Statute") requires the Company to meet certain energy efficiency and peak demand reduction ("EE&PDR") benchmarks; and

WHEREAS, when complying with certain EE&PDR benchmarks the Company may include the effects of mercantile customer-sited EE&PDR projects; and

WHEREAS, Customer has certain customer-sited demand reduction, demand response, or energy efficiency project(s) as set forth in attached Exhibit 1 (the "Customer Energy Project(s)") that it desires to commit to the Company for integration into the Company's Energy Efficiency & Peak Demand Reduction Program Portfolio Plan ("Company Plan") that the Company will implement in order to comply with the Statute; and

WHEREAS, the Customer, pursuant to the Public Utilities Commission of Ohio's ("Commission") September 15, 2010 Order in Case No. 10-834-EL-EEC, desires to pursue a cash rebate of some of the costs pertaining to its Customer Energy Project(s) ("Cash Rebate") and is committing the Customer Energy Project(s) as a result of such incentive.

WHEREAS, Customer's decision to commit its Customer Energy Project(s) to the Company for inclusion in the Company Plan has been reasonably encouraged by the possibility of a Cash Rebate.

WHEREAS, in consideration of, and upon receipt of, said cash rebate, Customer will commit the Customer Energy Project(s) to the Company and will comply with all other terms and conditions set forth herein.

NOW THEREFORE, in consideration of the mutual promises set forth herein, and for other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the parties, intending to be legally bound, do hereby agree as follows:

1. **Customer Energy Projects.** Customer hereby commits to the Company and Company accepts for integration into the Company Plan the Customer Energy Project(s) set forth on attached Exhibit 1. Said commitment shall be for the life of the Customer Energy Project(s). Company will incorporate said project(s) into the Company Plan to the extent that such projects qualify. In so committing, and as evidenced by the affidavit attached hereto as Exhibit A, Customer acknowledges that the information provided to the Company about the Customer Energy Project(s) is true and accurate to the best of its knowledge.

- a. By committing the Customer Energy Project(s) to the Company, Customer acknowledges and agrees that the Company shall control the use of the kWh and kW reductions resulting from said projects for purposes of complying with the Statute. By committing the Customer Energy Project(s), Customer has the ability to either:
- i. Take ownership of the Energy Efficiency resource credits resulting from their Customer Energy Project(s) and may be able to bid - or sell - the Energy Efficiency resource credits into the market operated by the grid operator, PJM Interconnection, Inc. (PJM), provided several prerequisites are met; or
 - ii. Allow the Company to take ownership of the Energy Efficiency resource credits associated with their Customer Energy Project(s). The Company shall, at its sole discretion, aggregate said capacity into the PJM market through an auction. Any proceeds from any such bids accepted by PJM will be used to offset the costs charged to the Customer and other of the Company's customers for compliance with state mandated energy efficiency and/or peak demand requirements.

Please indicate your preference as to the treatment of your Energy Efficiency resource credits:

☐ Customer would like to retain ownership of its Energy Efficiency resource credits.

☒ Customer assigns ownership of its Energy Efficiency resource credits to Company for purposes of bidding these credits into PJM.

- b. The Company acknowledges that some of Customer's Energy Projects contemplated in this paragraph may have been performed under certain other federal and/or state programs in which certain parameters are required to be maintained in order to retain preferential financing or other government benefits (individually and collectively, as appropriate, "Benefits"). In the event that the use of any such project by the Company in any way affects such Benefits, and upon written request from the Customer, Company will release said Customer's Energy Project(s) to the extent necessary for Customer to meet the prerequisites for such Benefits. Customer acknowledges that such release (i) may affect Customer's cash rebate discussed in Article 3 below; and (ii) will not affect any of Customer's other requirements or obligations.
- c. Any future Customer Energy Project(s) committed by Customer shall be subject to a separate application and, upon approval by the Commission, said projects shall become part of this Agreement.
- d. Customer will provide Company or Company's agent(s) with reasonable assistance in the preparation of the Commission's standard joint application for approval of this Agreement ("Joint Application") that will be filed with the Commission, with such Joint Application being consistent with then current Commission requirements.
- e. Upon written request and reasonable advance notice, Customer will grant employees or authorized agents of either the Company or the Commission reasonable, pre-arranged access to the Customer Energy Project(s) for purposes of measuring and verifying energy savings and/or peak demand reductions resulting from the Customer Energy Project(s). It is expressly agreed that consultants of either the Company or the Commission are their respective authorized agents.
2. **Joint Application to the Commission.** The Parties will submit the Joint Application using the Commission's standard "Application to Commit Energy Efficiency/Peak Demand Reduction Programs" ("Joint Application") in which they will seek the Commission's approval of (i) this

Agreement: (ii) the commitment of the Customer Energy Project(s) for inclusion in the Company Plan; and (iii) the Customer's Cash Rebate.

The Joint Application shall include all information as set forth in the Commission's standard form which, includes without limitation:

- i. A narrative description of the Customer Energy Project(s), including but not limited to, make, model and year of any installed and/or replaced equipment;
- ii. A copy of this Agreement; and
- iii. A description of all methodologies, protocols, and practices used or proposed to be used in measuring and verifying program results.

3. **Customer Cash Rebate.** Upon Commission approval of the Joint Application, Customer shall provide Company with a W-9 tax form, which shall at a minimum include Customer's tax identification number. Within the greater of 90 days of the Commission's approval of the Joint Application or the completion of the Customer Energy Project, the Company will issue to the Customer the Cash Rebate in the amount set forth in the Commission's Finding and Order approving the Joint Application.

- a. Customer acknowledges: i) that the Company will cap the Cash Rebate at the lesser of 50% of Customer Energy Project(s) costs or \$250,000; ii) the maximum rebate that the Customer may receive per year is \$500,000 per Taxpayer Identification Number per utility service territory; and iii) if the Customer Energy Project qualifies for a rebate program approved by the Commission and offered by the Company, Customer may still elect to file such project under the Company's mercantile customer self direct program, however the Cash Rebate that will be paid shall be discounted by 25%; and
- b. Customer acknowledges that breaches of this Agreement, include, but are not limited to:
 - i. Customer's failure to comply with the terms and conditions set forth in the Agreement, or its equivalent, within a reasonable period of time after receipt of written notice of such non-compliance;
 - ii. Customer knowingly falsifying any documents provided to the Company or the Commission in connection with this Agreement or the Joint Application.
- c. In the event of a breach of this Agreement by the Customer, Customer agrees and acknowledges that it will repay to the Company, within 90 days of receipt of written notice of said breach, the full amount of the Cash Rebate paid under this Agreement. This remedy is in addition to any and all other remedies available to the Company by law or equity.

4. **Termination of Agreement.** This Agreement shall automatically terminate:

- a. If the Commission fails to approve the Joint Agreement;
- b. Upon order of the Commission; or
- c. At the end of the life of the last Customer Energy Project subject to this Agreement.

Customer shall also have an option to terminate this Agreement should the Commission not approve the Customer's Cash Rebate, provided that Customer provides the Company with written

notice of such termination within ten days of either the Commission issuing a final appealable order or the Ohio Supreme Court issuing its opinion should the matter be appealed.

5. **Confidentiality.** Each Party shall hold in confidence and not release or disclose to any person any document or information furnished by the other Party in connection with this Agreement that is designated as confidential and proprietary ("Confidential Information"), unless: (i) compelled to disclose such document or information by judicial, regulatory or administrative process or other provisions of law; (ii) such document or information is generally available to the public; or (iii) such document or information was available to the receiving Party on a non-confidential basis at the time of disclosure.
 - a. Notwithstanding the above, a Party may disclose to its employees, directors, attorneys, consultants and agents all documents and information furnished by the other Party in connection with this Agreement, provided that such employees, directors, attorneys, consultants and agents have been advised of the confidential nature of this information and through such disclosure are deemed to be bound by the terms set forth herein.
 - b. A Party receiving such Confidential Information shall protect it with the same standard of care as its own confidential or proprietary information.
 - c. A Party receiving notice or otherwise concluding that Confidential Information furnished by the other Party in connection with this Agreement is being sought under any provision of law, to the extent it is permitted to do so under any applicable law, shall endeavor to: (i) promptly notify the other Party; and (ii) use reasonable efforts in cooperation with the other Party to seek confidential treatment of such Confidential Information, including without limitation, the filing of such information under a valid protective order.
 - d. By executing this Agreement, Customer hereby acknowledges and agrees that Company may disclose to the Commission or its Staff any and all Customer information, including Confidential Information, related to a Customer Energy Project, provided that Company uses reasonable efforts to seek confidential treatment of the same.
6. **Taxes.** Customer shall be responsible for all tax consequences (if any) arising from the payment of the Cash Rebate.
7. **Notices.** Unless otherwise stated herein, all notices, demands or requests required or permitted under this Agreement must be in writing and must be delivered or sent by overnight express mail, courier service, electronic mail or facsimile transmission addressed as follows:

If to the Company:

FirstEnergy Service Company
76 South Main Street
Akron, OH 44308
Attn: Victoria Nofziger
Telephone: 330-384-4684
Fax: 330-761-4281
Email: vmnofziger@firstenergycorp.com

If to the Customer:

Jo-Ann Stores Inc
5555 Darrow Rd
Hudson, OH 44236
Attn: Debbie Mansfield
Telephone: 330-656-2600
Fax:
Email: debbie.mansfield@joann.com

or to such other person at such other address as a Party may designate by like notice to the other Party. Notice received after the close of the business day will be deemed received on the next business day; provided that notice by facsimile transmission will be deemed to have been received by the recipient if the recipient confirms receipt telephonically or in writing.

8. **Authority to Act.** The Parties represent and warrant that they are represented by counsel in connection with this Agreement, have been fully advised in connection with the execution thereof, have taken all legal and corporate steps necessary to enter into this Agreement, and that the undersigned has the authority to enter into this Agreement, to bind the Parties to all provisions herein and to take the actions required to be performed in fulfillment of the undertakings contained herein.
9. **Non-Waiver.** The delay or failure of either party to assert or enforce in any instance strict performance of any of the terms of this Agreement or to exercise any rights hereunder conferred, shall not be construed as a waiver or relinquishment to any extent of its rights to assert or rely upon such terms or rights at any later time or on any future occasion.
10. **Entire Agreement.** This Agreement, along with related exhibits, and the Company's Rider DSE, or its equivalent, as amended from time to time by the Commission, contains the Parties' entire understanding with respect to the matters addressed herein and there are no verbal or collateral representations, undertakings, or agreements not expressly set forth herein. No change in, addition to, or waiver of the terms of this Agreement shall be binding upon any of the Parties unless the same is set forth in writing and signed by an authorized representative of each of the Parties. In the event of any conflict between Rider DSE or its equivalent and this document, the latter shall prevail.
11. **Assignment.** Customer may not assign any of its rights or obligations under this Agreement without obtaining the prior written consent of the Company, which consent will not be unreasonably withheld. No assignment of this Agreement will relieve the assigning Party of any of its obligations under this Agreement until such obligations have been assumed by the assignee and all necessary consents have been obtained.
12. **Severability.** If any portion of this Agreement is held invalid, the Parties agree that such invalidity shall not affect the validity of the remaining portions of this Agreement, and the Parties further agree to substitute for the invalid portion a valid provision that most closely approximates the economic effect and intent of the invalid provision.
13. **Governing Law.** This Agreement shall be governed by the laws and regulations of the State of Ohio, without regard to its conflict of law provisions.
14. **Execution and Counterparts.** This Agreement may be executed in multiple counterparts, which taken together shall constitute an original without the necessity of all parties signing the same page or the same documents, and may be executed by signatures to electronically or telephonically transmitted counterparts in lieu of original printed or photocopied documents. Signatures transmitted by facsimile shall be considered original signatures.

IN WITNESS WHEREOF, the Parties hereto have caused this Agreement to be executed by their duly authorized officers or representatives as of the day and year set forth below.

Ohio Edison Company_
(Company)

By: John C. Luzzi

Title: V.P. Of Energy Efficiency

Date: 4-9-14

Jo-Ann Stores Inc._
(Customer)

By: [Signature]

Title: DIRECTOR, ENERGY & FACILITIES

Date: 04/03/2014

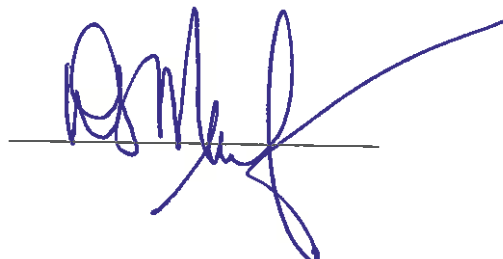
Affidavit of Jo-Ann Stores Inc – Exhibit _A_

STATE OF OHIO)
)
COUNTY OF Summit) SS:

I, Debbie Mansfield ,being first duly sworn in accordance with law, deposes and states as follows:

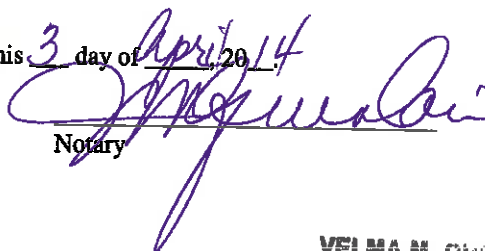
1. I am the Director of Energy and Facilities of Jo-Ann Stores Inc. ("Customer") As part of my duties, I oversee energy related matters for the Customer.
2. The Customer has agreed to commit certain energy efficiency projects to Ohio Edison Company ("Company"), which are the subject of the agreement to which this affidavit is attached ("Project(s)").
3. In exchange for making such a commitment, the Company has agreed to provide Customer with Cash ("Incentive"). This Incentive was a critical factor in the Customer's decision to go forward with the Project(s) and to commit the Project(s) to the Company.
4. All information related to said Project(s) that has been submitted to the Company is true and accurate to the best of my knowledge.

FURTHER AFFIANT SAYETH NAUGHT.



Sworn to before me and subscribed in my presence this 3 day of April, 2014.

Notary



VELMA M. GUINARD
NOTARY PUBLIC, STATE OF OHIO
My Commission Expires 8/26/2017

This foregoing document was electronically filed with the Public Utilities

Commission of Ohio Docketing Information System on

6/17/2014 11:50:12 AM

in

Case No(s). 14-0264-EL-EEC

Summary: Application to Commit Energy Efficiency/Peak Demand Reduction Programs of Ohio Edison Company and Jo-Ann Stores Inc electronically filed by Ms. Jennifer M. Sybyl on behalf of Ohio Edison Company and Jo-Ann Stores Inc