

APPLETON AREA OHV RECREATIONAL PARK

Contact: Curt Vacek
838 North Hering Street
Appleton, MN 56208
(320) 734-4451
curt.vacek@state.mn.us



Richard Otten
Certified Energy Manager, #16973
Association Energy Engineers
608 North Freeman
Luverne, MN 56156
(507) 227-5103
richardaotten@yahoo.com

Consultant's Report

CONTENTS OF REPORT

SYSTEMS CONSIDERED IN AUDIT	Page 3
REPAIR SHOP SUMMARY OF ELECTRICAL RECOMMENDATIONS	Page 4
REPAIR SHOP SUMMARY OF GAS RECOMMENDATIONS	Page 5
BUILDING ENVELOPE	Page 6
REPAIR SHOP HEATING LOSS CALCULATIONS	Page 7
REPAIR SHOP ENERGY PROFILE	Page 8
REPAIR SHOP ENERGY SCHEDULE BY ELECTRIC USAGE	Page 9
REPAIR SHOP ENERGY SCHEDULE BY GAS USAGE	Page 10
REPAIR SHOP ENERGY CONSUMPTION ANALYSIS	Page 11
REPAIR SHOP USAGE DATA 2013 & 2014	Page 12
REPAIR SHOP PHOTOGRAPHS	Page 13
REPAIR SHOP PHOTOGRAPHS #2	Page 14
FINAL RECOMMENDATIONS	Page 15

SYSTEMS CONSIDERED IN AUDIT

REPAIR SHOP

Building Envelope
Natural Gas Water Heater
Lighting
Natural Gas Furnace
Shop Equipment

REPAIR SHOP SUMMARY OF ELECTRICAL RECOMMENDATIONS

RECOMMENDATIONS FOR ENERGY SOURCES BY KWH USAGE	EXISTING MMBTU USAGE	PROPOSED MMBTU USAGE	ANNUAL MMBTU SAVINGS	ANNUAL DOLLAR SAVINGS	REPLACEMENT COST	PAYBACK IN YEARS
Shop Lighting T-12	1.63	0.52	1.11	\$ 39.17	\$ 1,200.00	\$ 30.64
Furnace Fan	0.60	0.43	0.17	\$ 6.00	\$ 50.00	\$ 8.33
TOTAL	2.23	0.95	1.28	\$ 45.17	\$ 1,250.00	\$ 27.67
SAVINGS PERCENTAGE IN MMBTU USAGE	57%					

The shop lighting is T12 lighting with the older style magnetic ballasts. LED lighting will improve the efficiency as well as improve the lighting quality of the facility. Occupancy sensors would ensure the lights are not left on during times when the building is not occupied.

A setback thermostat would ensure the furnace is set a minimum during non occupied times. The thermostat can be overridden when someone needs the area warmer and would default back to the preset temperature. The heated side could be set at 45 degrees, which is the typical minimum of most setback thermostats.

Note: Payback on all these measures would be better if the activity in the building would increase.

REPAIR SHOP SUMMARY OF GAS RECOMMENDATIONS

RECOMMENDATIONS FOR ENERGY SOURCES BY GAS USAGE	EXISTING MMBTU USAGE	PROPOSED MMBTU USAGE	ANNUAL MMBTU SAVINGS	ANNUAL DOLLAR SAVINGS	REPLACEMENT COST	PAYBACK IN YEARS
Separation Wall insulation	8.74	1.82	6.92	\$ 69.16	\$ 400.00	\$ 5.78
Furnace	60.00	32.50	27.50	\$ 275.00	\$ 2,600.00	\$ 9.45
Replace Gas with 4 gallon Electric	10.95	1.24	9.71	\$ 97.09	\$ 500.00	\$ 5.15
TOTAL	79.69	35.56	44.13	\$ 441.25	\$ 3,500.00	\$ 7.93
SAVINGS PERCENTAGE IN MMBTU USAGE	55%					

The wall between the warm and cold area should be filled with blown cellulose insulation. This will create a more effective thermal break between these areas.

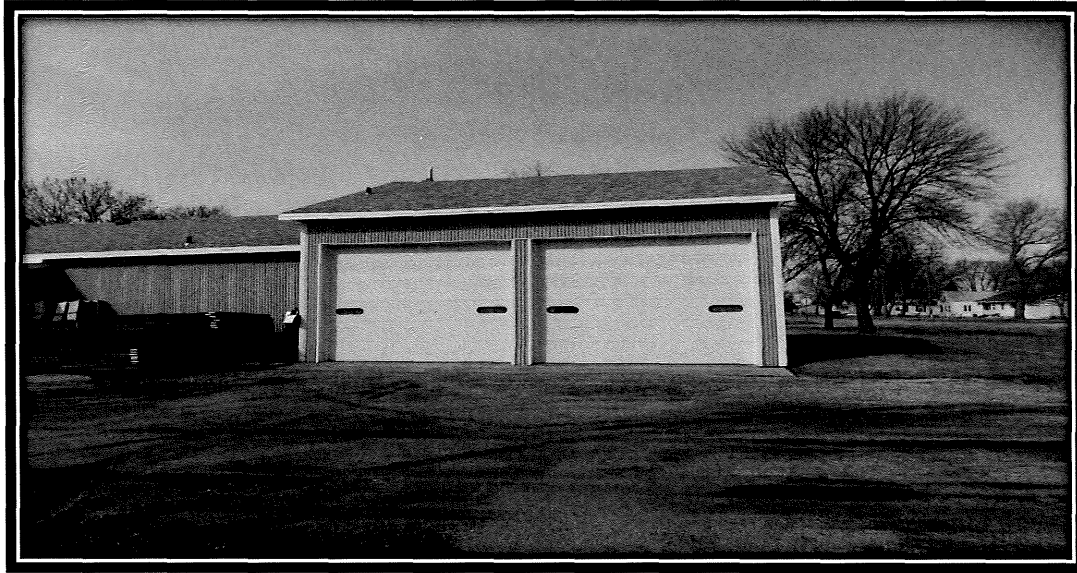
The heated side of the building also contains several attic bypasses including around the perimeter where the ceiling meets the wall. This should be caulked for air tightness.

The furnace should be replaced with a high efficiency forced air furnace which could be hung in the same location as the existing Reznor furnace the condensate line run to the bathroom drain system.

The gas water heater can be replaced with an electric under the counter water heater. This will save on standby losses incurred by the 50 gallon electric.

The heated side overhead doors weather-stripping is good, the unheated side weather-stripping is in poor condition. The windows of the unheated side are also in poor condition. These items have little relevance to energy consumption.

BUILDING ENVELOPE



Repair Shop

Appleton Area DNR shop is used as a base for the land management work vehicles for that area. The north side of the building is 1484 sq foot of heated office, bathroom, workshop and vehicle storage with two insulated overhead doors facing the west. The south side is a 1400 sq foot, non heated building with two 16'x12' doors facing to the east.

REPAIR SHOP HEATING LOSS CALCULATIONS

SURFACE OR LOCATION	SAVINGS IN HEATING BY MMBTU	SAVINGS IN COOLING BY MMBTU	HEATING COST IN SAVINGS	COOLING COST IN SAVINGS
Separation Wall From Heated to Cold Storage	6.92	0.00	69.16	0
TOTAL	6.92	0.00	\$ 69.16	\$ -

REPAIR SHOP ENERGY PROFILE

TYPE OF FUEL	COST PER UNIT	DOLLARS PER MMBTU
Electrical Rate	\$ 0.12	\$ 35.29
Natural Gas Rate	\$ 1.00	\$ 10.00

FUEL USAGE	ANNUAL MMBTU	ANNUAL PERCENT	USAGE EQUIPMENT
2014 Electrical Usage	2.66	3.63%	Lighting, Furnace Fan, Shop Equipment
2014 Gas Usage	70.52	96.37%	Natural Gas Furnace & Natural Gas Water Heater
TOTAL	73.18	100%	

REPAIR SHOP ENERGY SCHEDULE BY ELECTRIC USAGE

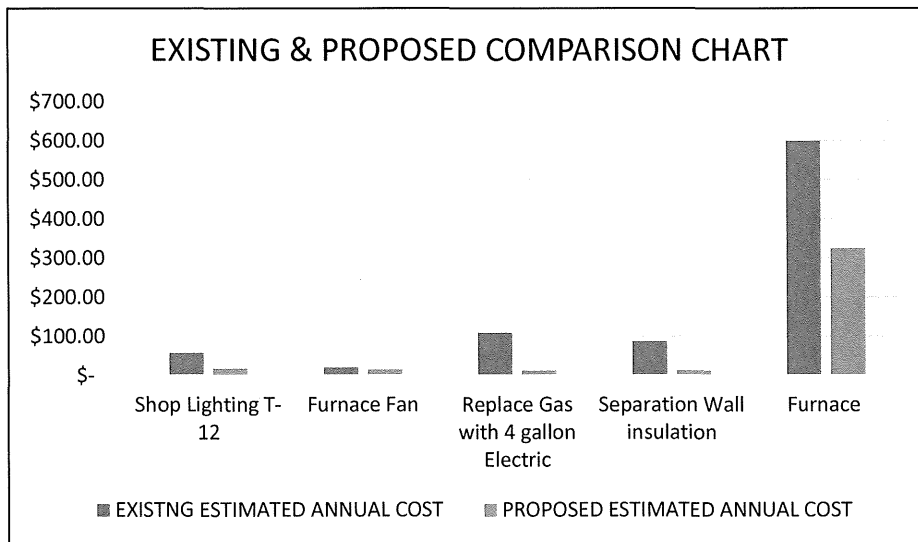
EXISTING						PROPOSED					
SURFACE OR LOCATION	LAMP/EQUIP	QUANT	EXIST KW	HRS PER YEAR	ANNUAL TOTAL KWH EXISTING	RETRO FIT TYPE	MOTION SENSOR	TOTAL KW PROPOSED	HOURS PER YEAR PROPOSED	ANNUAL TOTAL KWH PROPOSED	ANNUAL SAVINGS PER KWH
Shop Lighting T-12	T-12	24	0.04	500	480	LED	YES	0.016	400	153.6	80
Furnace Fan	Heating	1	0.25	700	175	SETBACK THERMO-STAT	No	0.25	500	125	50
TOTAL			0.29		655			0.266		278.6	130

REPAIR SHOP ENERGY SCHEDULE BY GAS USAGE

EXISTING						PROPOSED					
SURFACE OR LOCATION	EQUIPMENT	QUANT	EXISTING MMBTU	HRS PER YEAR	ANNUAL TOTAL MMBTU EXISTING	RETRO FIT TYPE	SETBACK THERMO-STAT	TOTAL MMBTU PROPOSED	HOURS PER YEAR PROPOSED	ANNUAL TOTAL MMBTU PROPOSED	ANNUAL SAVINGS MMBTU
Hanging Furnace	SPACING HEATING FURNACE	1	0.10	600	60	92% FURNACE	YES	0.065	500	32.5	27.5
Gas Water Heater	Existing gas, proposed electric	1	0.03	365	10.95	Electric 4 gallon under sink	NO	0.0034	365	1.241	9.709
TOTAL			0.13		70.95			0.0684		33.741	37.209

REPAIR SHOP ENERGY CONSUMPTION ANALYSIS

ENERGY SOURCE	EXISTNG ESTIMATED ANNUAL COST	EXISTING PERCENT OF ANNUAL COST	PROPOSED ESTIMATED ANNUAL COST	PROPOSED PERCENT OF ANNUAL COST
Shop Lighting T-12	\$ 57.60	7%	\$ 18.43	5%
Furnace Fan	\$ 21.00	2%	\$ 15.00	4%
Replace Gas with 4 gallon Electric	\$ 109.50	13%	\$ 12.41	3%
Separation Wall insulation	\$ 87.36	10%	\$ 12.41	3%
Furnace	\$ 600.00	69%	\$ 325.00	85%
TOTAL	\$ 875.46	100%	\$ 383.25	100%



REPAIR SHOP USAGE DATA 2013 & 2014

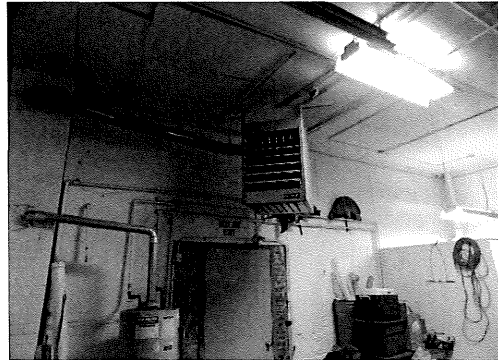
2013	HDD (KAQP)	CDD (KAQP)	KWH USAGE	ENERGY COST	NATURAL GAS USAGE	NATURAL GAS COST
January	1,493	0	39	\$ 19.34	99	\$ 87.62
February	1,325	0	45	\$ 19.30	54	\$ 52.42
March	1,240	0	41	\$ 19.14	101	\$ 90.90
April	842	1	34	\$ 17.75	64	\$ 65.21
May	291	36	127	\$ 26.12	8	\$ 20.53
June	55	147	148	\$ 26.50	3	\$ 14.02
July	20	253	138	\$ 26.45	3	\$ 14.34
August	9	212	125	\$ 25.75	1	\$ 16.75
September	83	130	782	\$ 23.51	0	\$ 13.88
October	540	7	61	\$ 19.47	1	\$ 16.04
November	990	0	31	\$ 18.68	39	\$ 44.80
December	1,649	0	93	\$ 23.96	142	\$ 129.01
TOTALS	8,537	786	1,662	\$ 265.98	516	\$ 565.51

2014	HDD (KAQP)	CDD (KAQP)	KWH USAGE	ENERGY COST	NATURAL GAS USAGE	NATURAL GAS COST
January	1624	0	143	\$ 28.07	169	\$ 165.20
February	1480	0	88	\$ 23.55	147	\$ 156.44
March	1153	0	84	\$ 23.84	116	\$ 133.07
April	652	0	46	\$ 19.26	54	\$ 67.63
May	277	70	81	\$ 23.25	18	\$ 33.21
June	22	133	57	\$ 21.25	3	\$ 18.14
July	26	153	37	\$ 18.46	2	\$ 18.80
August	9	173	45	\$ 20.74	2	\$ 17.76
September	154	59	40	\$ 17.86	4	\$ 19.18
October	470	0	9	\$ 3.83	3	\$ 19.62
November	1218	0	64	\$ 21.02	73	\$ 77.76
December	1262	0	89	\$ 23.59	113	\$ 114.92
TOTALS	8,347	588	782	\$ 244.73	705	\$ 841.73

REPAIR SHOP PHOTOGRAPHS



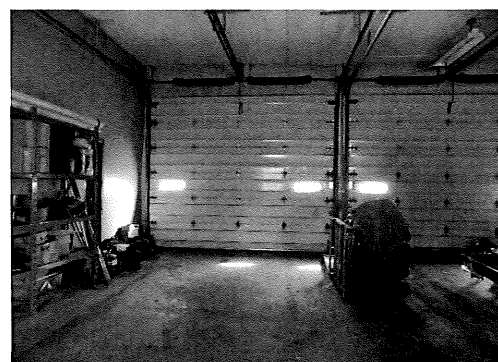
This is a 50 Gallon AO Smith water heater. Most of the operation costs are standby losses. Recommend replacement with 4 gallon under the sink unit.



The hanging reznor furnace heats the south portion of the building.

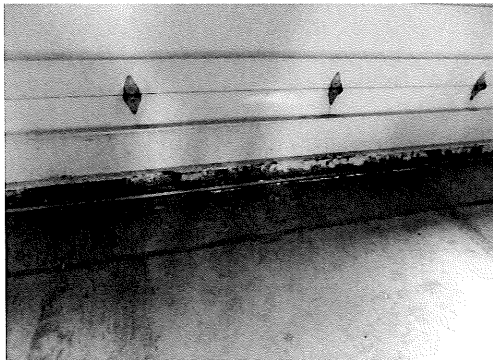


The space heater on the unheated side of the building is not used.

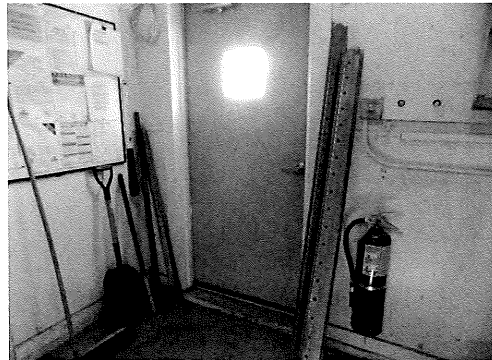


The overhead doors on heated side are insulated and the weather-strip is good.

REPAIR SHOP PHOTOGRAPHS #2



The garage door astragal is deteriorated on unheated side of building.



The side entry door should be replaced with a steel insulated door both for security and energy savings.



There is about 12" insulation in the attic. There would not be a considerable savings by adding 4" to attic. The walls contain expanded foam which appears to be contracted. Not much that can be done without major renovation of the sidewalls.



This security light was not consider as part of the usage because manager thought it may be a separate billing. An LED retrofit would save on energy costs if it is part of the existing usage.

FINAL RECOMMENDATIONS

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