Sample Screening Report for *(Site Name)*

DATE: ***(when screening performed)*** **SUMMARY: Results indicate site merits further study of potential**

The purpose of the CHP screenings performed by FEMP is to help federal sites determine if their conditions merit further study of CHP potential, and if so, to suggest next steps. These screenings are based on general site information and assumptions; results should be regarded only as a starting point in the exploration of CHP feasibility for the site. Many technical and organizational factors will impact decisions about implementing CHP technologies, such as future mission needs, equipment replacement plans, utility rate schedules, and the value of energy security. For more information on FEMP services, contact *(e-mail address of FEMP regional contact)* in DOE's *(appropriate)* Regional Office. For more information on this report and CHP, contact the ORNL representative noted below.

1. Site Contacts: *(Site point of contact info.)*	**2. ORNL contacts**: Linda Stansberry, Oak Ridge National Laboratory, FEMP CHP team support, (865) 574-0266, stansberryl@ornl.gov
3. Description of Current Installation Three thirty year old, 35,000 lb/h dual fuel boilers - winter peak ~ 35 MMBtu/h and summer load ~ 9 MMBtu/h; 5642 tons of chilled water and forced air A/C using centrifugal and reciprocating chillers and rooftop heat pump units; 3455 kW of emergency power on site	**4. CHP Option Assessed** 3500 kW combustion gas turbine with heat recovery steam generator producing 17,000 lb/h steam
5. Energy Costs Reported Electricity: $0.134 / kWh Natural Gas: $11.25 / MMBtu Spark Spread: $28.06 / MMBtu	**6. Energy Consumption Reported** Electricity: 32,827,612 kWh Natural Gas: 144,651 MMBtu Thermal/Electric (T/E) Ratio: 1.29
7. Economics: Approximate CHP Cost: $4.7 million CHP Savings Factor: $0.077/ kWh	Simple payback w/ $11.25/MMBtu gas: 2.1 yrs* Simple payback of 10 yrs w/ $25/MMBtu for fuel* * assumes 100% utilization of waste heat

8. General Factors Affecting CHP

Factors favoring CHP Feasibility:	Spark Spread $/MMBtu > $12	Elec. cost $/kWh > $0.05	NG cost $/MMBtu < $6.00	Elec. load Avg/peak > 0.7	Thermal load Avg/peak > 0.7	Payback (years) <10
Value for Site	$28.06	$0.134	$11.25	0.66	0.69	2.1

9. Observations:

a) The high price of electricity offers strong opportunities to achieve net operating savings from a CHP plant at the site in spite of the high fuel costs that were given.

b) The simple payback period calculated at ~two years is derived from the assumed costs for installed equipment and fuel, and assumes that 100% of the recoverable waste heat could be used effectively. Seasonal and daily fluctuations in steam demand make this unlikely. Simple payback period increases to 3 years if only 75% of recoverable heat can be used to offset purchased boiler fuel, and 5 years at 50%. At least 15% of recoverable waste heat must be used for the CHP system to operate at any net savings unless there is a decline in the $11.25/MMBtu fuel cost. The most cost-effective and energy-efficient CHP systems optimize use of waste heat.

c) CHP thermal output represents a significant fraction of operating boiler capacity (site noted that only one of the three boilers operates during the winter and that summer loads are on the order of 9 MMBtu/h). Further analysis based on more detailed information regarding existing and potential thermal loads would be necessary to improve analysis and system sizing to maximize economic benefits within constraints on emissions.

10. Assumptions and Definitions

a) "CHP Savings Factor" is a measure of the net savings from operating a CHP plant. It includes the avoided costs of purchased electricity, increased fuel and O&M costs, standby charges, and the value of recovered heat.

b) CHP installed cost is based on recent industry estimates; federal project costs are often higher.

c) Annual operating hours assume two weeks for scheduled maintenance and unscheduled outages.

d) A $25/kW-year standby charge is assumed for the full rated capacity of the CHP equipment.

e) "Spark Spread": indicates $/MMBtu difference between electricity and fuel (gas) rates – a higher spread favors CHP economics.

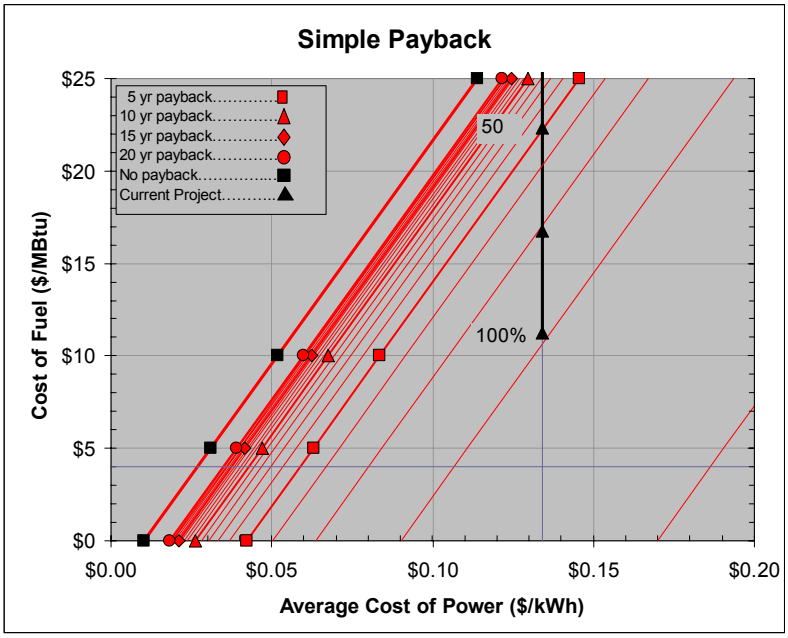
f) T/E Ratio: Thermal to Electric ratio reflects the relative balance of thermal and electric loads and can be a factor

in determining the most appropriate type of equipment for a site.

g) Avg/Peak ratio: measures base load relative to peak. Ratios close to 1.0 indicate steady electrical loads without high peaks. Higher ratios facilitate sizing and control of CHP systems for favorable economics. Low ratios are indicative of high peak demands; a CHP system designed for peak shaving combined with utility DSM incentives might be viable but requires a more rigorous analysis than provided by this screening.

11. Economics & Payback Period

The results for this site are driven by the high average cost of $0.13/kWh for electricity. Careful consideration should be given to the sensitivity of results to changes in costs for both fuel and electricity. This graph illustrates the sensitivity of the simple payback period analysis to variations in energy costs (fuel on vertical axis and electricity on horizontal) and waste heat utilization. The vertical line represents the project assessed at different levels of heat utilization. The diagonal lines reflect payback periods for the project investment (the left-most of these is where there is no payback, or infinite payback period). The best payback period will occur when all recoverable heat can be utilized (bottom triangle on vertical line). In this case, the simple payback period is about 2 years with 100% utilization. Payback period increases to 3 years at 75% and to 5 years at 50% waste heat use. This analysis is based on the reported $11.25 gas rate. Simple paybacks under different electric and fuel rates may be estimated using this graph.



12. Next Steps

a) To facilitate a more accurate CHP assessment, consider special conditions – additional loads, energy security, equipment replacement – that might impact CHP economics.

b) Private partners can help verify CHP opportunities and provide project financing.

c) Identify state and local emission requirements related to permitting of a CHP plant; this is a key factor affecting equipment type, initial project costs and operating costs.

d) Utility rate schedules are key in determining CHP feasibility. Identify potential impacts on energy rates under a CHP scenario (Could better gas rates be negotiated? What are standby rates for on-site generation? Are exit fees applicable? Would your load profile coupled with CHP allow you to take advantage of DSM or other incentive programs?)

e) Analyze hourly or 15 min. interval data for a one-year period from your electric utility. This will permit better CHP sizing to electrical load. Compare this to results from thermal analysis (below).

f) Detailed data from the gas utility, logs for boiler and/or chiller operation, and thermal demand qualifications at your site (temperature and rate) should be analyzed to improve sizing of CHP equipment for maximum efficiency and use of recovered waste heat. Site-specific boiler efficiency information is also helpful.

g) If you are considering an on-site energy system for security or other reasons, look into all potential thermal applications to use the waste heat. CHP will nearly always improve project economics and efficiency.

h) Call FEMP if you need help with next steps or have questions about this assessment.