



## Northwest CHP Application Center

Combined Heat and Power for the states of  
Alaska, Idaho, Montana, Oregon and Washington  
in cooperation with the U.S. Department of Energy



### KONGIGANAK, ALASKA, POWER PLANT AND RECOVERED HEAT FACILITIES

#### Facility Description

The Village Council operates the electric utility in Kongiganak, Alaska. The power plant is a 30'x48' foam-core panel building on a steel piling foundation, *see Figure 1*. The power plant building was constructed new in 2004. The power plant is equipped with four diesel generators with a total capacity of 755 kW. Power is generated at 480V and is provided to the community via three phase 7.2/12.47kVA step-up transformers and a three-phase overhead distribution system. Based on reported kWh sold in 2005, the annual electric generation is estimated at 916,500 kWh, *see Figure 2*.

Heat from the diesel generator cooling system is used to heat the power plant building and is pumped through above grade insulated arctic pipe from the power plant to the nearby water treatment plant, *refer to Figure 3 and attached site plan and schematic*. Heat exchangers located in the power plant and water treatment plant isolate the arctic piping from the generator cooling system and from the water treatment plant hydronic heating system.

#### Combined Heat and Power (CHP) Equip.

##### Power Plant

- Generators (#1 diesel fuel engines)
  - o John Deere 6125 235 kW
  - o John Deere 6081 190 kW
  - o John Deere 6081 190 kW
  - o John Deere 6081 140 kW
- Heat Exchanger (HX-1), brazed plate, 350 MBH, Ameridex SL140TL-LL-80
- Circulating pump (P-HR1), 50 gpm @ 7' TDH, 1/3 hp, 115V, 1 phase, Grundfos UPS40-40
- Circulating pump (P-HR3), 45 gpm @ 19' TDH, 1/2 hp, 115V, 1 phase, Grundfos UPS40-80/4

##### End User

- Water Plant
  - o Heat Exchanger (HX-1), brazed plate, 350 MBH, Ameridex SL140TL-LL-80
  - o 3 each boilers (B-1, B-2, B-3)



Figure 1: Kongiganak Power Plant

925 Plum St SE, Bldg 4 • P.O. Box 43165 • Olympia, WA 98504-3165  
(360) 956-2004 • Fax (360) 236-2004 • TDD: (360) 956-2218

Cooperating agencies: Washington State University Extension Energy Program, U.S. Department of Energy, Alaska Energy Authority, Idaho Department of Water Resources Energy Division, Montana Department of Environmental Quality Energy Program and Oregon Department of Energy

### Estimated Fuel Savings

The heat recovery system was commissioned in 2005 to provide heat to the water treatment plant and is estimated to save the City approximately 12,900 gallons of heating fuel per year, see Figure 4.

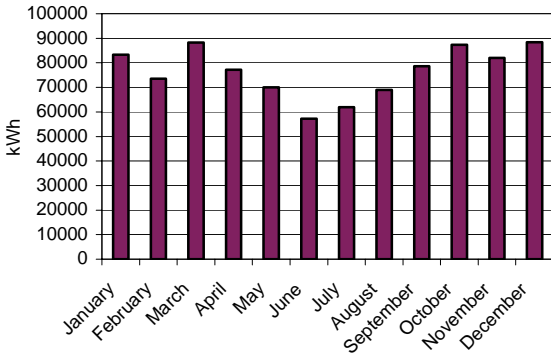


Figure 2: Electric Generation Profile

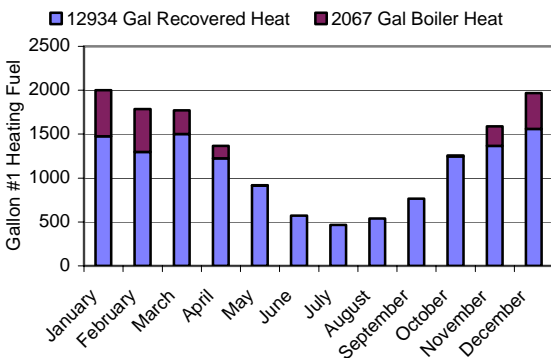


Figure 4: Thermal Energy Provided

### Additional Considerations

When generators are ready for replacement, consideration should be given to installation of marine manifold units of similar capacity to increase the amount of jacket water heat available for recovery.



Figure 3: Heat Recovery System