



## 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



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

#### Facility Description

The City operates the electric utility in Kokhanok, Alaska. The power plant is a 30'x48' foam-core panel building on a concrete slab 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 495 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. The 2005 annual electric generation is approximately 420,000 kWh, *see Figure 2*.

Heat from the diesel generator cooling system is used to heat the school complex and is pumped through below grade insulated arctic pipe from the power plant to the nearby school mechanical building, *refer to Figure 3 and attached site plan and schematic*. A single heat exchanger located in the power plant isolates the generator cooling system from the arctic piping and the school hydronic heating systems.

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

##### Power Plant

- Generators (#1 diesel fuel engines)
  - o John Deere 4045 60 kW
  - o John Deere 6068 115 kW
  - o John Deere 6081 160 kW
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- Heat Exchanger (HX-1), brazed plate, 300 MBH, Ameridex SL140TL-LL-80
- Circulating pump (P-HR1), 35 gpm @ 7' TDH, 1/6 hp, 115V, 1 phase, Grundfos UP50-75F

##### End User

- School
  - o Circulating pump (P-HR3), 40 gpm @ 8' TDH, 1/3 hp, 115V, 1 phase, Grundfos UPS40-40
  - o Boiler (B-1), oil fired 408 MBH, Weil McLain BL676SW
  - o Boiler (B-2), oil fired 886 MBH, Weil McLain BL878SW



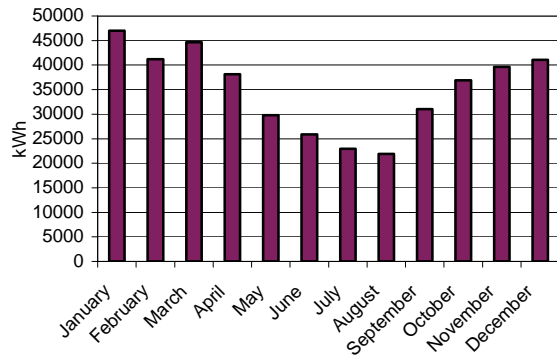
Figure 1: Kokhanok Power Plant

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

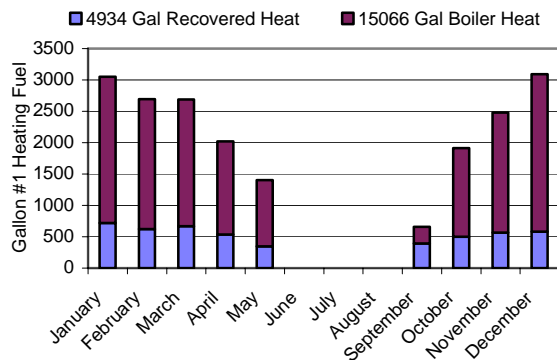
Cooperating agencies: Washington State University Extension Energy Program, U.S. Department of Energy, Alaska Energy Authority, Idaho Department of Water Resources Energy Division, Montana Department of Environmental Quality Energy Program and Oregon Department of Energy

**Estimated Fuel Savings**

The heat recovery system was installed in 2004 to provide heat to the school and saved the school approximately 4,900 gallons of heating fuel per year, see *Figure 4*.



**Figure 2: Electric Generation Profile**



**Figure 4: Thermal Energy Provided**

**Additional Considerations**

When either of the smaller units is ready for replacement a marine manifold unit of similar capacity should be installed to increase the amount of jacket water heat available for recovery.



**Figure 3: Heat Recovery System**