



Kenai Peninsula Borough  
Maintenance Department

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**MEMORANDUM**

**TO:** Wayne Ogle, Assembly President  
Members, Kenai Peninsula Borough Assembly

**THRU:** Charlie Pierce, Mayor 

**FROM:** Scott M. Griebel, Maintenance Director 

**DATE:** December 21, 2018

**RE:** Ordinance 2018-19- 23, Appropriating \$425,000 from the General Fund for the Design and Replacement of the Boiler Plant at Homer High School (Mayor)

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The borough Maintenance Department has encountered a dilemma with regards to the Homer High School ("HHS") boiler plant. It is approaching an end-of-life state where a crucial judgment call must be made. Specifically, should the existing boilers receive a required complete restoration repair or should the plant be upgraded/replaced? The following will outline the cost and benefits of both, along with a departmental recommendation:

The three original boilers are Cleaver Brooks CB 100-125 scotch marines ("CB") installed in 1984, when the HHS facility was constructed. [Fig.1] With the 2014 Enstar Homer extension, the units were converted to natural gas ("NG") by modifying the front door assemblies and fitting them with Riello power burners. [Fig.2] The current and dire issue with the CB boilers is related to water side corrosion that has compromised the integrity of all of the fire tubes. [Fig.3]

The Maintenance Department has been contracting for tube replacement repairs more and more frequently over recent years (\$15,669 in 2004, \$4,179 in 2017 & \$4,237 in 2018). The damage is now to the extent where the certified pressure vessel contractor will not repair the No. 1 unit unless all of the tubes are replaced. This work (Option 1) represents a wholesale rebuild of the boiler and would involve the entire plant (3 boilers) at a soon future point. The contractor has not responded to cost quotes requested for the service. Assuming recent service costs to scale, we estimate \$55,000-\$65,000 per boiler (x3), for a total of \$195,000 for the rebuilds.

Additionally, since the boilers were NG converted, we have been struggling with lower stack temperatures. This has resulted in the formation of stack condensate, causing corrosion of the assembly. If the plant remains as existing, we will soon be forced to replace a large section of the stack assembly at an estimated cost of \$40,000. Coupled with this will be a requirement to increase the firing rate in order to raise stack temps and halt condensate formation. This will cause a strong negative impact on plant energy efficiency. The repair option would result in a \$205,000-\$235,000 project cost and an estimated 5% increase in NG/energy costs.

An alternative course (Option 2) would be the designed replacement of the entire boiler plant, utilizing modern and energy efficient components. The main benefits of this option would be new equipment with a reset service life expectancy and a conservatively estimated 20% enhancement in energy efficiency. The primary costs associated with this option are the design, equipment purchase and installation. The unit appliances that have been investigated range from \$60,000-\$65,000 per package unit (x3) with \$25,000 in additional associated materials (total project). We estimate (dependent on in-house or contracted installation) labor to involve 40-80% of the cost for materials. Design costs would likely range from \$15,000-\$30,000. With those factors considered, the total cost of the project is estimated between \$302,000-\$425,000, coupled with an estimated 20% decrease in current NG/energy costs (as compared to the +5% increase in NG/energy costs of Option 1).

Considering the costs and benefits of the two viable options the Maintenance Department recommends Option 2, boiler plant replacement and modernization. In terms of efficiency and long-term cost benefits, plant replacement is a superior option over existing patchwork repair. The project cost difference between the two options is as little as \$70,000, with an annual NG/energy savings of \$23,000 in favor of the replacement option (3-year payback). Even considering a worst case cost comparison, the energy cost savings will support the difference over a nine-year period.

This ordinance would appropriate \$425,000 from the General Fund fund balance to design and replace the entire boiler plant, utilizing modern and energy efficient components. This capital project will also result in estimated operational savings that the school district will experience directly through natural gas cost savings in their annual utility expenditures.

FINANCE DEPARTMENT ACCOUNT / FUNDS VERIFIED	
Acct. No.	<u>100.00000.00000.27910</u>
Amount:	<u>\$425,000</u>
By: <u>pp</u> <u>8x</u>	Date: <u>12/18/18</u>

**Fig.1:** Boilers with their original burner configuration.



**Fig.2:** CB boilers fitted with door conversions and Riello burners.



**Fig.3:** Removed fire tube showing extensive corrosion.

