

US EPA ARCHIVE DOCUMENT

BADGER REPOWER COSTS

The SPARTAN numbers are from a study done by ELLIOT BAY in 1999 that generated a cost estimate for the BADGER'S refurbishment and repower.

The BADGER 1999 numbers are the cost to repower the Badger in 1999 extrapolated from the information in the ELLIOT BAY cost estimate for the SPARTAN. The SPARTAN is the sister vessel to the BADGER.

The BADGER 2012 cost estimate is the BADGER'S 1999 cost estimate, plus 3.5% annual compounding interest for inflation for 13 years.

	SPARTAN	BADGER 1999	BADGER 2012
Ship Yard Services:	\$438,660.00	\$438,660.00	\$686,044.97
The allowance for asbestos abatement in the Ship Yard Services portion of the ELLIOT BAY quote seemed very low relative to my experience. LMCF considers this rate <u>very</u> conservative.			
Hull and Superstructure:	\$1,159,233.00	\$235,600.00	\$368,468.05
Cost not relative to BADGER repower subtracted.			
Propulsion Machinery:	\$5,720,786.00	\$5,720,786.00	\$8,947,057.93
Electrical Systems:	\$593,976.00	\$450,048.00	\$703,855.30
Cost not relative to BADGER repower subtracted.			
Navigation Equipment:	\$217,225.00	\$55,425.00	\$86,682.26
Cost not relative to BADGER repower subtracted.			
Auxiliary Systems:	\$1,293,606.00	\$357,885.00	\$559,716.41
Cost not relative to BADGER repower subtracted.			
Outfitting, Safety, and Painting:	\$2,048,419.00	\$238,655.00	\$373,245.93
Cost not relative to BADGER repower subtracted.			
Deck Machinery:	\$216,018.00	\$0	\$0
Cost not relative to BADGER repower subtracted.			

Compliance Upgrades: \$0 \$0 \$1,000,000.00

Compliance upgrades are not part of the ELLIOT BAY cost estimate.

Relative to the scope of the project it is to be expected that upgrades will have to be made to the vessel to bring certain items up to current standards. These upgrades are somewhat subjective and typically at the discretion of the U.S. Coast Guard. These upgrades can include, but are not limited to: bulkhead configuration, vessel structure, electrical, life-saving equipment, and fire suppression.

Engineering & Inspections:

\$455,270.62

Based on a 2010 estimate from Chapman Technical
adjusted for inflation at 3.5% annually.

Contingency @ 10%

\$1,168,791.00

\$1,318,034.15

Total: \$12,856,714.00

\$14,498,375.62

This quotation is considered low because it does not take into consideration the cost of current and upcoming emission standards for repowering and, as mentioned above, the allowance for asbestos abatement seems to be conspicuously low.

Anticipated Cost of the Repower of S.S. BADGER

To derive the anticipated cost of the repower of the BADGER, three methods were used.

1. In 2009, LMCF hired a marine consultation firm (Chapman Technical) to estimate the cost of repowering the Badger. Chapman Technical has experience in the repowering of vessels and has done wide ranging engineering work on Great Lakes historic auto and freight vessels such as the Badger.
2. Utilizing the machinery information from Chapman Technical's correspondence dated February 22, 2010, Bay Shipbuilding supplied LMCF with a quote to repower the Badger.
3. LMCF also evaluated a comprehensive study done by Elliott Bay Design Group in 1999 for the refurbishment of the Spartan, the sister ship to the Badger and used pertinent information from that study to determine a comparative number for the Badger. To do so, the costs of proposed modifications to the Spartan that would not be needed on the Badger were subtracted and the remaining costs were adjusted for inflation.

By averaging the three cost estimates LMCF arrived at what it believes is a realistic expectation for the cost of repowering the Badger.

Chapman Technical Estimate:	\$15, 500,000.00*
Bay Shipbuilding Estimate:	\$17,000,000.00**
Elliot Bay Design Estimate:	\$14,498,375.62

Total Average Estimated Cost of Repower: \$15,666,125.21

Interest and principal payments based on a \$15,666,125.21 loan; a ten year amortization and 4% interest would be \$158,611.90 monthly. This equates to an annual additional cost of \$1,903,342.80 for 10 years.

*2009 estimate

**Cost averaged from 2010 estimate

\$ 15,666,125.21

2/28/12

LMC / BADGER DIESEL REPOWER COST ESTIMATE

	BADGER
Ship Yard Services:	\$850,000.00
Hull and Superstructure:	\$116,000.00
Propulsion Machinery: Controls & Technology.	\$8,650,000.00
Electrical Systems:	\$750,000.00
Navigation Equipment:	\$65,000.00
Auxiliary Systems:	\$1,200,000.00
Outfitting Safety: and Painting.	\$217,000.00
Compliance Upgrades:	\$1,000,000.00
Engineering:	\$450,000.00
ABS:	\$150,000.00
Contingency @ 10%	<u>\$1,344,800.00</u>
Total :	\$14,792,800.00
LMC Estimated repower costs:	\$14,792,800.00
Bay Shipbuilding Company's Estimate:	\$17,000,000.00 Averaged / 2010 Quote
Chapman Technical's Estimate:	<u>+\$15,500,000.00</u> 2009 Quote
	\$47,292,800.00 / 3 = \$15,764,266.00

Total Averaged Estimated Cost of Repower: **\$15,764,266.00**

The quotes from the shipyard and Chapman Technical are dated. I would assume this to be a very conservative estimate.

Interest and principal payments based on a \$15,764,266.00 loan, a ten year amortization and 4% interest would be \$159,605.00 monthly. This equates to an annual additional cost of \$1,915,260.00.