



PAF

Interoffice Communication

To G. L. Foshee
From P. D. Despres
Date November 16, 1981
Subject High Efficiency Motors in the VCM Plant

In a communication on December 4, 1980 to F. C. Haub of CED, C. D. Spangler of PED indicated that existing electric motors in the plant may be economically replaced by high efficiency motors. An investigation of the VCM Plant motors and projected energy savings indicates that no motor replacements can be economically justified. However, original specification of a high efficiency type motor should be made in all new applications.

The high efficiency motor has an advantage over standard motors at all loading conditions, but the advantage is greatest at full load conditions. The differences in full-load efficiencies can be seen from the attached Figure 1, approximately 3% for motors 50 hp or less and 2% for larger motors. The charted values represent the mean nominal efficiencies of several motor manufacturers.

The savings realized from replacement of an existing standard motor with a high efficiency model depends directly on operating load and cost of electricity. However, the VCM Plant does not pay enough for electricity to justify replacing an existing motor with a high efficiency model. The amount of money saved on a single, new continuous duty installation can be determined from Figure 2. As of September, the cumulative 1981 cost of electricity to the plant was 3.14¢ per kilowatt-hour. If the average motor cost is considered, electricity prices will have to reach the levels listed in Table 1 before any existing motor should be replaced. These minimum limits on electricity costs reflect the replacement of just one motor. However, for virtually all single continuous duty applications in the VCM Plant, two motors are required. Accordingly, purchasing two motors for one application further reduces the attractiveness of replacing existing motors.

In creating Figures 1 and 2, efficiency and cost data for each size motor were averaged over three separate manufacturers. (Manufacturers commonly used in the VCM Plant and offering high efficiency models were used: Reliance, General Electric and Westinghouse.) Nominal efficiencies were used instead of guaranteed minimum efficiencies because they appear to be more appropriate, although less conservative. No allowances were made for discounts on list price that may be received from each manufacturer.

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The design of the high efficiency motor poses no significant maintenance problems. The principle of the motor is based on a larger number of windings on a longer aluminum stator. Rewinding of the motor can be done in Lake Charles with standard materials, retaining the design performance. The

Do we use aluminum stators? Is there a problem with EDC & aluminum that CRH's found out related to aluminum fire on EDC cooler in an analyzer??

aluminum stator is coated with an epoxy resin to prevent corrosion in acidic environments. Although the motor is slightly heavier and larger than the standard models, frame types are interchangeable and there should be no application problems.

If there are any questions or comments, please direct them to me (ext. 5049).


Paul D. Despres
Process Engineer

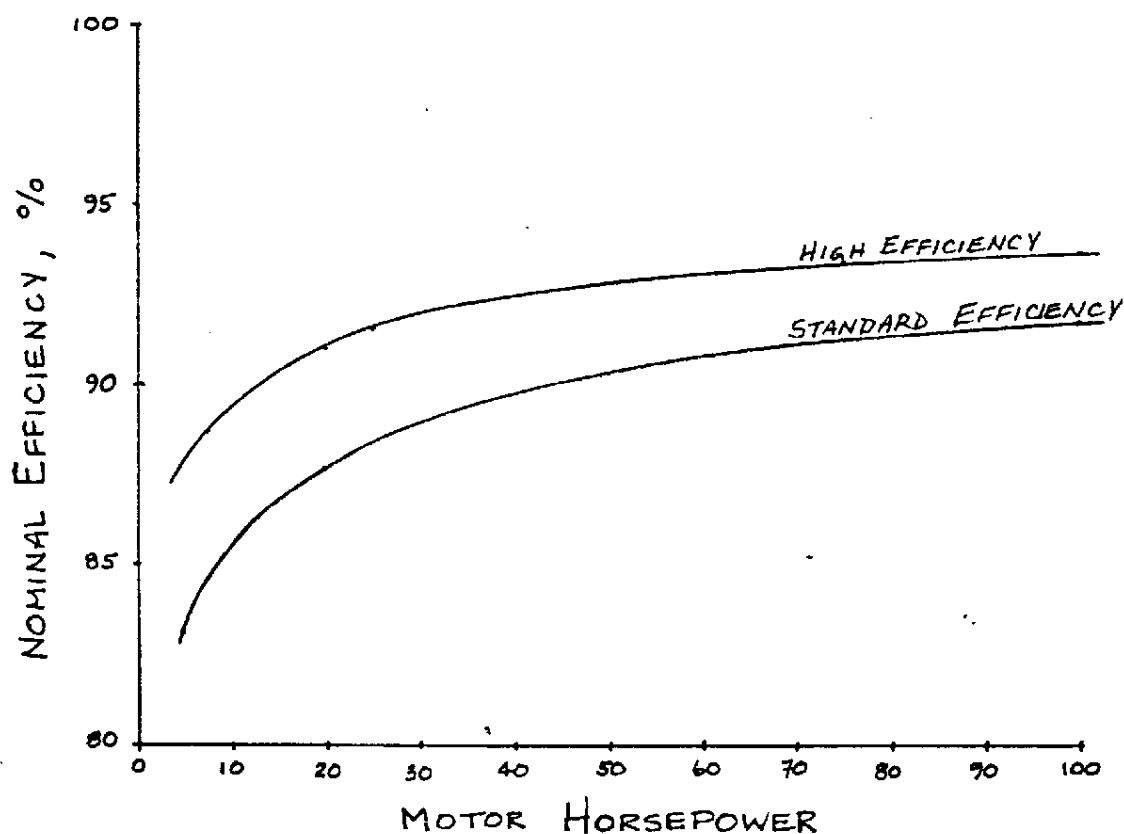
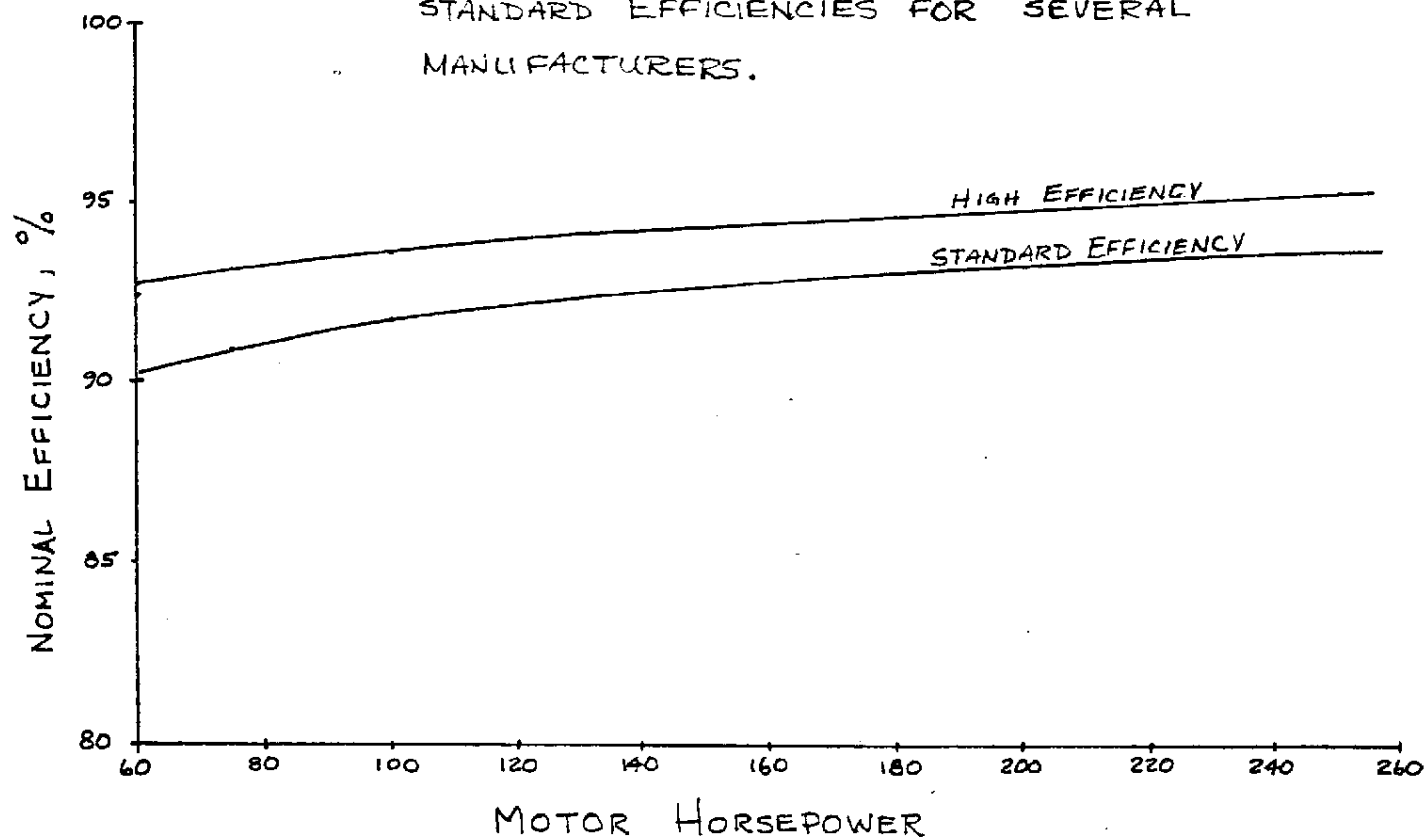
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JAD-JWW-JRH-MLA-CRH-DLD-PE

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FIGURE 1. COMPARISON OF THE AVERAGE HIGH AND STANDARD EFFICIENCIES FOR SEVERAL MANUFACTURERS.



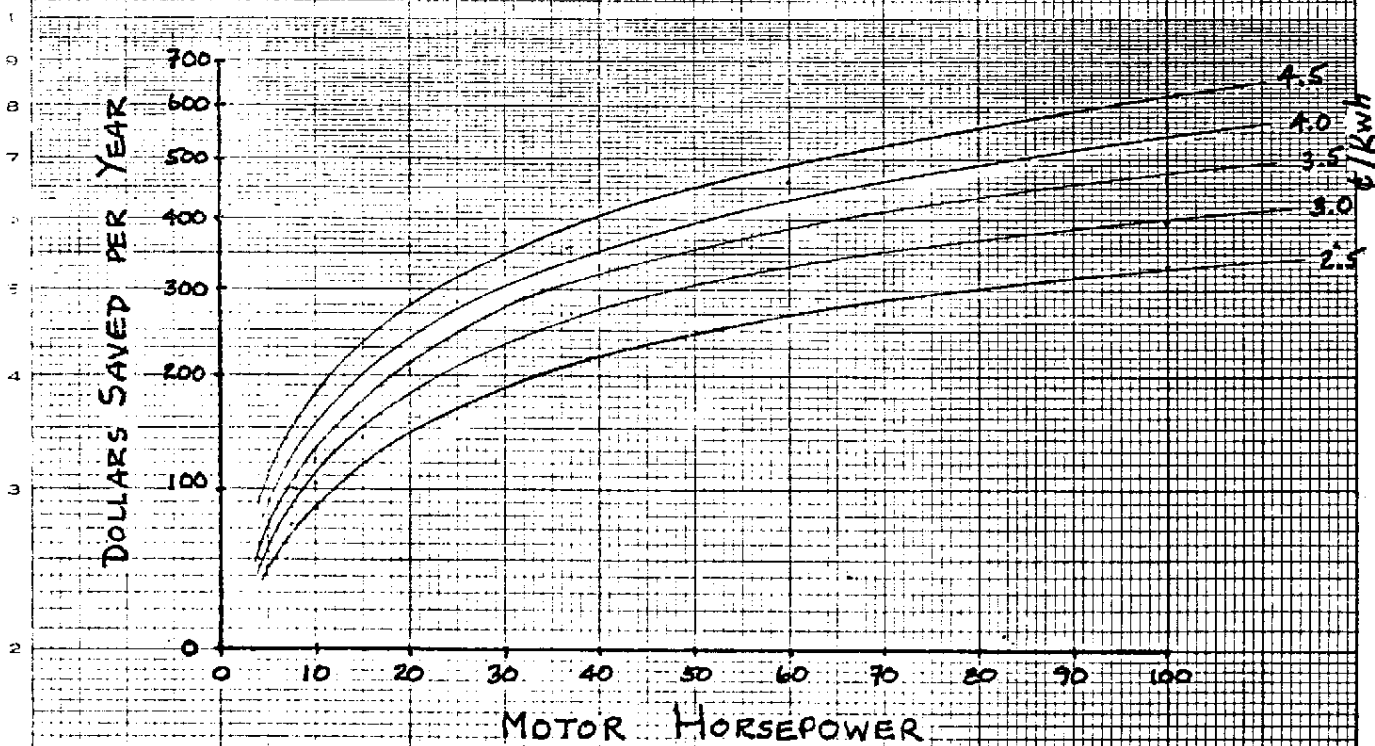
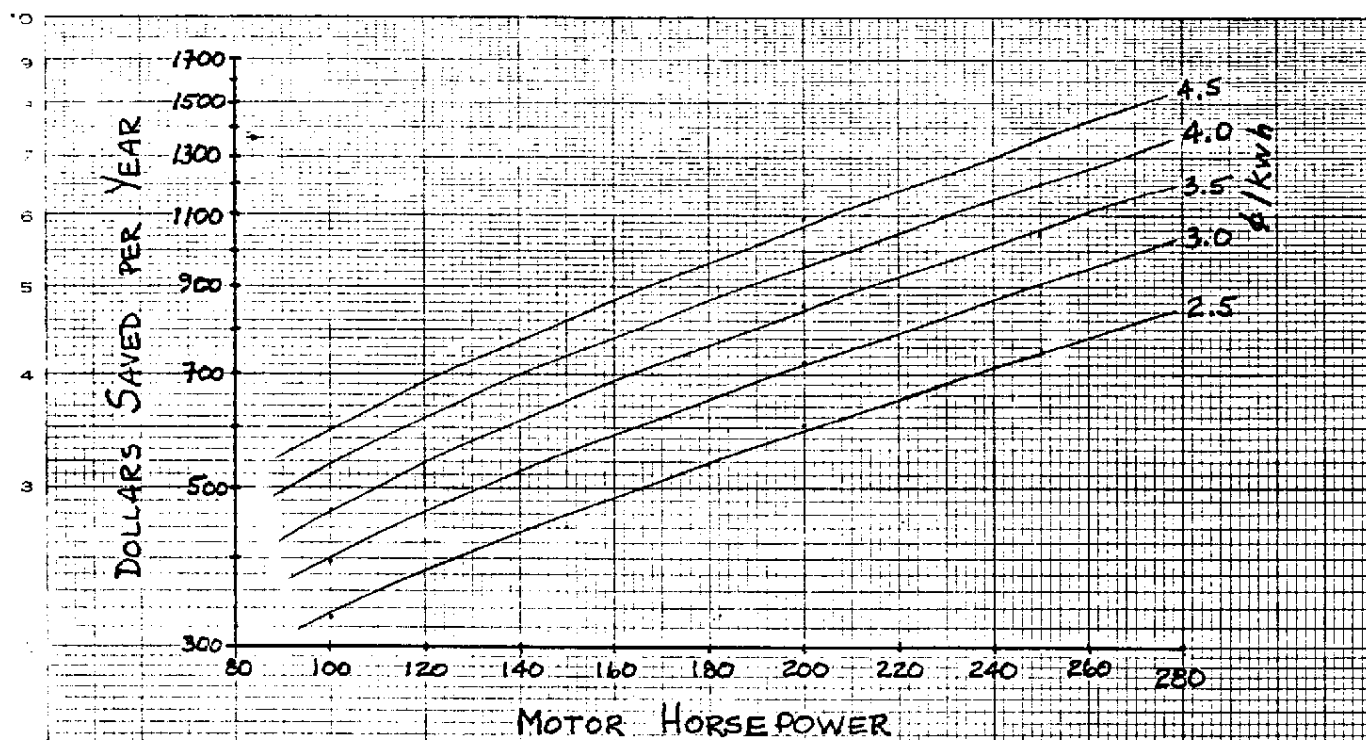


FIGURE 2. RETURN ON SELECTING A HIGH EFFICIENCY MOTOR OVER A STANDARD EFFICIENCY MOTOR FOR VARYING ELECTRICITY COSTS. 8000 HRS./YR.

FIGURE 3. ESTIMATING % DCF

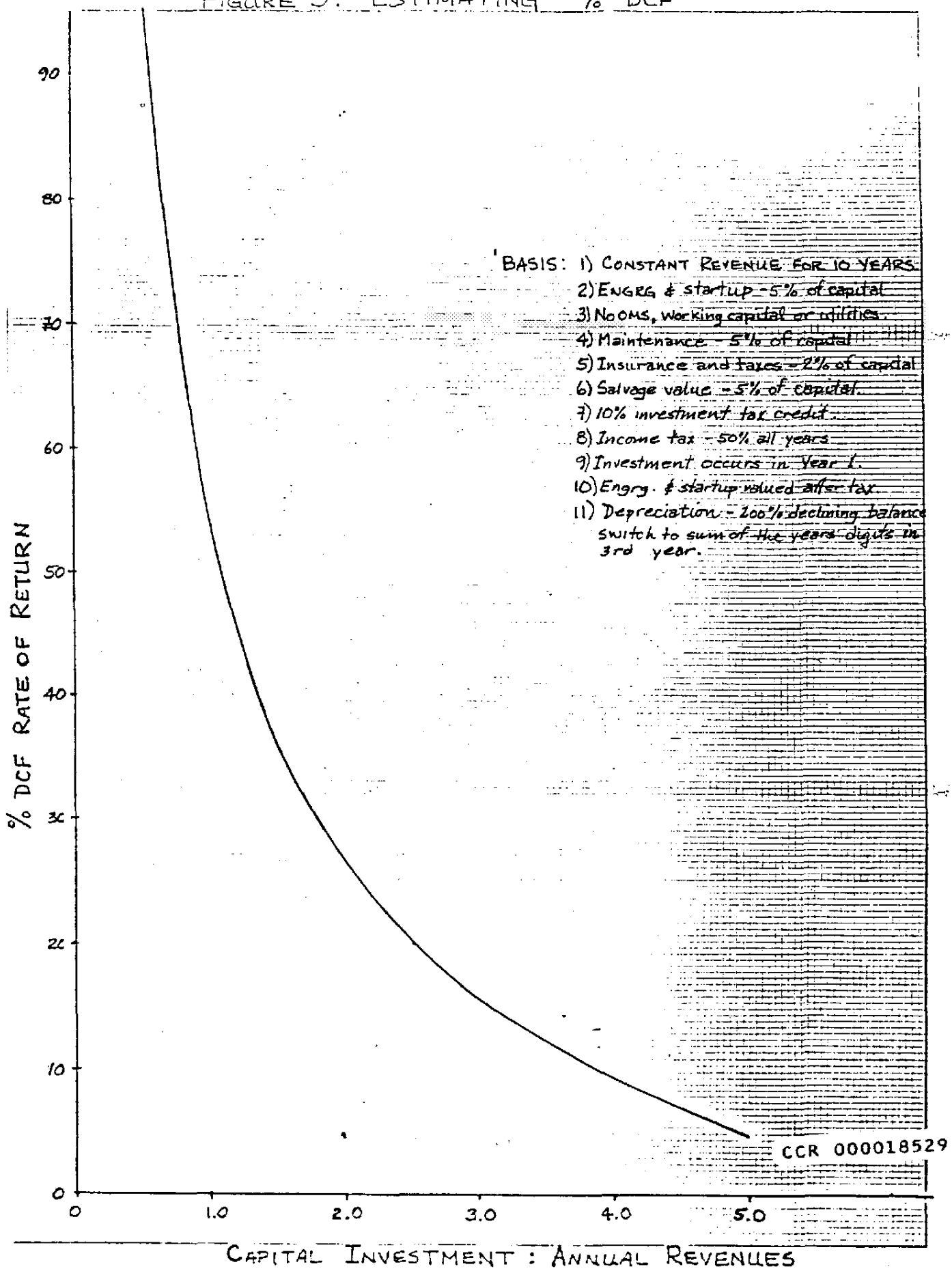


TABLE 1. MINIMUM ELECTRICITY COSTS TO JUSTIFY REPLACING A STANDARD MOTOR WITH A HIGH EFFICIENCY MODEL.

HP	MOTOR COST, ⁽¹⁾ \$	ELECTRICITY COSTS, ⁽²⁾ ¢/kWh FOR A DCF RETURN OF:	
		15%	30%
5	410	7.3	13.0
7½	520	5.7	10.2
10	620	5.8	10.3
15	820	6.5	11.6
20	1,010	6.3	11.3
25	1,240	6.3	11.2
30	1,510	5.7	10.2
40	1,980	8.7	15.5
50	2,370	11.2	19.9
60	3,000	9.3	16.6
75	3,710	9.3	16.6
100	4,860	11.7	20.9
125	6,100	11.8	21.1
150	6,980	12.7	22.7
200	8,850	11.7	20.8

¹ The basis for cost is an average value over all RPM ranges and three separate manufacturers. No discounts, labor or installation costs were considered.

² Using the rough estimate chart for DCF vs. \$invested: \$returned and the associated assumptions (Figure 3).

Jim DeBernardi



To

Date

~~5/19/82~~ FU

~~6/19/81~~

~~5/22/81~~

~~7/23/81~~

Any response from anyone?
Anything in 1982 Capital Budget??

4/27/81 Work being done on a project for 1982 Cap. Budget. However doesn't look to planning on payout due to spare motors etc. Apparently no problem on rebuild of motors affecting eff. Desperes working on this for Cap. Budget.

7/27 Nothing in capital budget on it. A lot of problems pay it out. How about '83 Capital Budget.

6/29 Nothing in 1983 Capital Budget on motors. Still not a payout.