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The Files - RD-138, T.O. 4

20 March 1959

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Conference Report - Hand Crank Generator, HG-3

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1. On 12 March 1959 a conference was held in [redacted] with representatives of the [redacted] to discuss a prototype model of the Hand Crank Generator, HG-3, developed under Contract RD-138, Task Order 4. Present at the discussions were:

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[redacted] - OC-E/R&D-EP

2. The first prototype of the HG-3 was demonstrated by Messrs. [redacted] and, electrically, the generator performed well. In the demonstration, the generator was used to charge a 12-volt nickel-cadmium battery rated at 1.6 ampere-hours. To this battery, the HG-3 delivered 15 watts of power at a constant current of one ampere. This meets with the specified output of 15 watts. Also, specifications called for the HG-3 to be in a package with dimensions of 2 x 4 x 8 inches and to weigh under 8 pounds. The model of the HG-3 demonstrated was of the dimensions called for and weighed 5.75 pounds.

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3. This model of the HG-3 utilized timing belts, rather than gears, in three stages to give a speed ratio of 30:1. After cranking a few minutes, the belt in the first stage had a tendency to slip. [redacted] stated, however, that this problem would be overcome by replacing the belt in the first stage with gears. This change will be made within the next 3 weeks and the generator will then be delivered for evaluation.

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4. Other than the slipping of the belt in the first stage, the HG-3 is generally an acceptable item. [redacted] stated that [redacted] is well ahead of schedule for expending funds on this task. He believes that an additional prototype can be constructed to further reduce the losses in the HG-3, thus making it more efficient. One approach is to make the case of plastic, thus lowering the losses due to eddy currents through the present aluminum case. In the present model, the generator itself is approximately 95% efficient and the overall efficiency is about 80%. At best, the overall efficiency could be raised to 88 or 90% with the majority of the losses in the electronic circuitry.

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5. It is conceivable that the HG-3 may be used to charge the sealed nickel-cadmium batteries. Since the generator is a constant current type, the voltage will not exceed a value which could damage the battery until the final phase of the charge. By having an incandescent lamp as an indicator which illuminates when the battery has reached full charge, the operator will be able to stop charging before the battery becomes damaged. The contractor was asked to procure a 2 1/4 ampere-hour, 12-volt, sealed-cell battery (Sonotone size D) and perform tests with the HG-3 to determine the feasibility of charging this type of battery.

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