



# SHILSTONE TESTING LABORATORY, INC.

INSPECTING AND CONSULTING  
CHEMISTS & ENGINEERS **G**  
CARGO SURVEYORS

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JOB NO.: 329-25-CL  
LAB. NO.: 4107-CL  
REPORT NO.: 1  
DATE: August 15, 1966

TO: WHOM IT MAY CONCERN

FOR ACCOUNT OF: BATTERY POWER, INC.  
FOREIGN TRADE ZONE  
NEW ORLEANS, LOUISIANA, 70130

ATTENTION OF: MR. ROBERT R. ARONSON, PRESIDENT

REPORT ON: HIGHWAY ROAD TESTS ON MARS I, AN  
ELECTRICALLY POWERED AUTOMOBILE  
EQUIPPED WITH LEAD-ACID BATTERIES  
AND MOUNTED IN A CONVERTED RENAULT-  
DAUPHINE BODY

On August 9, 1966, this office was instructed to perform various road tests on the above subject electrically powered automobile. It was required that we perform a low speed highway test at 20-25 mph during average road and weather conditions for the purpose of determining the useful cruising range and the approximate electrical costs per mile. It was also required to determine the maximum highway speed in miles per hour, maximum speed of acceleration in ten (10) seconds, and the maximum speed on a 1:5 gradient climb.

The electrically powered Mars I was equipped with 96 volt, lead-acid, Pow-R-Lok battery banks for electric power and one (1) 12-volt Pow-R-Lok battery for accessories. These batteries were of patented construction as follows:

	<u>96-volt Batteries</u>	<u>12-volt Battery</u>
Battery size, S.A.E.	8D	2SM
Battery size, A.A.B.M.	8D	24
Ampere capacity:		
at 20 hour rate	202 amps	57 amps
at 20 minute rate	262 amps	74 amps
Pow-R-Lok Catalog No.	8D-XD	24-XD

The Renault-Dauphine body was of a recent model. The batteries were installed in the front and rear of the car, and there were two battery chargers mounted permanently in the front.

The low speed highway test was started at 1:30 PM, August 13, 1966, at 2724 St. Nick Drive, New Orleans, Louisiana. A recent model Ford Falcon was used as the control car in checking speed, distance, and cost per mile. The Falcon followed the Mars I during the tests and both cars were stopped after one hour of driving to determine voltage characteristics and specific gravities of the batteries in the Mars I. An average speed of both cars was maintained at approximately 23 mph.

Weather conditions were clear or cloudy about 90% of the time with light showers and wet roads during the remainder of the time. Both cars were driven through heavy, medium and light traffic conditions. Approximately 75% of the highways were concrete and 25% of the roads were black top or asphalt.

The route of the low speed road test consisted of a round trip from New Orleans, Louisiana, to Empire, Louisiana, on State Highway No. 23. At the completion of the trip, the batteries in the Mars I were not discharged, and it was necessary to drive on city streets in order to complete the test. The end of the useful cruising range was considered to be complete when the Mars I could not be driven above 20 mph. It was driven to the garage, however, under its own power.

After the test, all batteries in the Mars I were charged with a Recotype RX25 battery charger and the kilowatt hours required for a full battery charge was determined on a separate watt hour meter supplied by the New Orleans Public Service Inc. A record was kept on the quantity of gasoline used on the round trip, and the cost per mile for each car was calculated.

The maximum highway speed and the acceleration in ten (10) seconds was determined the following day on Interstate Highway No. 10. The maximum speed on a 1:5 gradient climb was determined on the New Mississippi River Bridge at New Orleans.

The results of all the above road tests were determined as follows:

Maximum Useful Cruising Range - - - - -	120.3 miles
Cost of Electricity (Mars I):	
At an average rate of 2.3¢/KW - - - - -	1.22¢/mile
At a minimum rate of 1.5¢/KW - - - - -	0.8¢/mile
Cost of gasoline (Ford Falcon): - - - - -	1.61¢/mile
Maximum Highway Speed - - - - -	52 MPH
Acceleration in 10 seconds - - - - -	40 MPH
Maximum Speed on a 1:5 Gradient Climb - - - - -	45 MPH

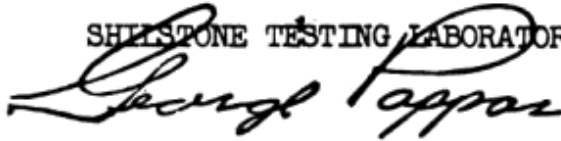
The results of the tests indicated that the Mars I had a practical cruising range for city driving. The maximum highway speed, acceleration in 10 seconds and the speed in climbing a 1:5 gradient permitted ease in handling in heavy city traffic and on freeway driving. The cost per mile was found to be exceptionally low, especially if oil changes, tune ups and anti-freeze were considered.

This office was advised that this is the maximum cruising range attained by an electrically powered automobile. This is all the more significant since the electric power was from lead-

acid batteries.

Respectfully submitted,

SHILSTONE TESTING LABORATORY, INC.

A handwritten signature in cursive script that reads "George Pappas". The signature is written in dark ink and is positioned over the printed name and company name.

GEORGE PAPPAS, P. E.

5GP:WP