SNAP 19 VIKING PROGRAM
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DESIGN AND SYSTEM ENGINEERING

A. Accomplishments

1. Monitoring and evaluation of Viking Lander 1 power system data continued. Figures 1 thru 6 show typical SOL day cycles for mission days 1211 and 1281. The RTG series power range as measured at the PCDA was 65 to 67 watts at finroot temperatures between 280°F and 310°F. The data shown are in December 1979 and February 1980. Figures 7 thru 12 show the Mars lander performance history of Viking 1. These data include both the minimum and maximum data for each of the SOL days plotted to show the range of performance experienced on the Martian surface.
2. Final available power system data for Viking Lander 2 are shown in Figs. 13 thru 21. Typical SOL day cycles for mission day 1193 are presented in Figures 13 to 15. These data were for January 1980. The RTG series power ranged from 69 to 70 watts at finroot temperatures between 270°F and 300°F. The Mars lander performance history for Viking 2 is shown in Figures 16 thru 21. All parameters appear nominal and consistent with expectations for the period and climatic season on Mars.
3. Power system performance data for Pioneer 10 and Pioneer Saturn (initially designated Pioneer 11) were monitored through the reporting period and are shown in Figure 22. After adjusting for the telemetry characteristics, the estimated RTG system net power was 114 watts for both, Pioneer 10 and Pioneer Saturn. Signal quality from both systems has degraded during the last 60 days as evidenced by frequent double step excursions. Indicated power system performance continues to be satisfactory and as predicted.

FIGURE 1

VIKING LANDER CAPSULE NO. 1

RTG S/N 111 MARS DAY/NIGHT PERFORMANCE CYCLE

FIGURE 2

VIKING LANDER CAPSULE NO. 1

RTG S/N 112 MARS DAY/NIGHT PERFORMANCE CYCLE

FIGURE 3
VIKING LANDER CAPSULE NO. 1
RTG SERIES MARS DAY/NIGHT PERFORMANCE CYCLE

SOL DAY 1211

SHEET 3 OF 3

FIGURE 4

VIKING LANDER CAPSULE NO. 1

RTG S/N 111 MARS DAY/NIGHT PERFORMANCE CYCLE

SOL DAY 1281

SHEET 1 OF 3

FIN ROOT (THERMISTOR)
TEMPERATURE (°F)

HOT JUNCTION (RTD)
TEMPERATURE (°F)

LOAD VOLTAGE*
(VOLTS)

POWER OUTPUT*
(WATTS)

GMT 2/26/80

LOCAL LANDER TIME (HOURS)

FIGURE 5

VIKING LANDER CAPSULE NO. 1

RTG S/N 112 MARS DAY/NIGHT PERFORMANCE CYCLE

■ CALCULATED PARAMETERS AT RTG OUTPUT RECEPTACLE

TELEDYNE ENERGY SYSTEMS

FIGURE 6
VIKING LANDER CAPSULE NO. 1
RTG SERIES MARS DAY/NIGHT PERFORMANCE CYCLE

SOL DAY 1281

SHEET 3 OF 3

SHEET 1 OF 2

FIGURE 8
VIKING LANDER CAPSULE NO. 1
RTG S/N 111 PERFORMANCE

SHEET 2 OF 2

SHEET 1 OF 2

SHEET 2 OF 2

FIGURE 11
VIKING LANDER CAPSULE NO. 1
RTG SERIES PERFORMANCE

SHEET 1 OF 2

FIGURE 12 VIKING LANDER CAPSULE NO. 1 RTG SERIES PERFORMANCE

SHEET 2 OF 2

NOTE - THE MARS LANDED DATA INCLUDES BOTH
THE DAILY MINIMUM AND MAXIMUM DATA

FIGURE 13

VIKING LANDER CAPSULE NO. 2

RTG S/N 113 MARS DAY/NIGHT PERFORMANCE CYCLE

FIGURE 14

VIKING LANDER CAPSULE NO. 2

RTG S/N 114 MARS DAY/NIGHT PERFORMANCE CYCLE

■ CALCULATED PARAMETERS AT RTG OUTPUT RECEPTACLE

⊗ TELEDYNE ENERGY SYSTEMS

FIGURE 15
VIKING LANDER CAPSULE NO. 2
RTG SERIES MARS DAY/NIGHT PERFORMANCE CYCLE

SOL DAY 1193

SHEET 3 OF 3

FIGURE 16
VIKING LANDER CAPSULE NO. 2
RTG S/N 113 PERFORMANCE

SHEET 1 OF 2

FIGURE 17
VIKING LANDER CAPSULE NO. 2
RTG S/N 113 PERFORMANCE

SHEET 2 OF 2

^aCALCULATED PARAMETERS AT RTG POWER OUTPUT RECEPTACLE

TELEDYNE ENERGY SYSTEMS

FIGURE 18
VIKING LANDER CAPSULE NO. 2
RTG S/N 114 PERFORMANCE

SHEET 1 OF 2

FIGURE 19
VIKING LANDER CAPSULE NO. 2
RTG S/N 114 PERFORMANCE

SHEET 2 OF 2

■ CALCULATED PARAMETERS AT RTG POWER OUTPUT RECEPTACLE

TELEDYNE ENERGY SYSTEMS

FIGURE 20
VIKING LANDER CAPSULE NO. 2
RTG SERIES PERFORMANCE

SHEET 1 OF 2

FIGURE 21
VIKING LANDER CAPSULE NO. 2
RTG SERIES PERFORMANCE

SHEET 2 OF 2

NOTE - THE MARS LANDED DATA INCLUDES BOTH
THE DAILY MINIMUM AND MAXIMUM DATA

FIGURE 22
RTG FLIGHT SYSTEM PERFORMANCE