Each of the foregoing techniques undergoes periodic revaluation and review by both the Centers and the Manned Space Flight Facilities Office. These reviews are augmented by periodic reports which provide performance data and serve as a basis for a continuous total analysis of the maintenance program.

In view of continuing rising costs for labor and materials, definite steps have been taken to insure more effective utilization of maintenance resources while holding the line on maintenance costs. Significant improvements in maintenance management techniques have been accomplished resulting in improved efficiency and a reduction in costs. Examples of areas where cost reductions have taken place are as follows:

a. Utility Conservation—Savings have been effected by the institution of comprehensive conservation programs, and by scheduling activities to avoid high peak electrical demand periods, thereby reducing electrical utility costs.

b. Reduced Frequency of Custodial and Grounds Maintenance Tasks— Reduced costs have been effected by reducing the frequency of cleaning cycles, and reducing the intensive care areas for grounds maintenance. These reductions have not been made without due consideration to the possibility of increased deterioration of the facilities. Essentially, those services that were reasonable but were not essential to safety, health or necessary to the long-term preservation of condition were the only services reduced in frequency.

c. Supply Support—Annual purchase contracts for the purchase of standard maintenance supplies and materials have been negotiated at each location covering several thousand items. This technique reduces the cost of preparing numerous purchase orders throughout the year at obvious savings in clerical and processing costs. It has been found that a potential annual contract has led to spirited bidding by suppliers with resulting savings to the Government. Also the schedule of deliveries, agreed to by vendors, has permitted a reduction in storage requirements.

d. Instrumentation Pooling Program—As a part of the equipment management program, instrumentation pools are being initiated at several MSF installations. Savings are being derived due to improved utilization of existing instruments, and consolidation of Center-wide requirements for common-usage instruments resulting in "quantity procurements" at significant discounts.

e. "Off Season" Award of Service Contracts—Analysis of market conditions has led to the award of "one-term" repair projects, such as building repainting, repaving and reroofing, during the "off season". The cycle of these activities has been rescheduled now to take advantage of lower rates and competitive market conditions prevalent during these slow periods of construction and maintenance activities.

f. Reduction in Emergency Crews—Careful monitoring of the need for emergency crews during evenings or weekends has disclosed that significant reductions could be made in the size of crews required to provide this service. Emergency back-up is now provided by individuals who are designated to remain "on-call" in the event of an emergency during off-hours. This decision has led to significant reduction in costs but still provides for effective response in the event of an emergency.

g. More Effective Use of ADP Equipment—As the maintenance work load began to stabilize at each MSF Installation, positive steps were taken to reduce clerical scheduling and posting through the wider use of available ADP capability. As soon as sufficient information was accumulated, determinations could be made as to the most effective operation of facilities, better scheduling of preventive maintenance and more effective utilization of maintenance resources.

h. Increased Use of Automatic Monitoring Systems—As a part of the design of utility systems, cost studies are made to determine the "cost trade-offs" of operator monitoring of equipment operation versus automatic monitoring systems. The installation of the monitoring systems has led to significant operator cost savings as well as increased efficiency of the utility plant equipment. For example, at one MSF Center, the installation of a heating and cooling plant monitoring system has led to a force of roving operators numbering 54, where an unmonitored system would require 108 operators. The cost of acquisition and installation of the automatic monitoring system has been amortized in less than four years. At some of