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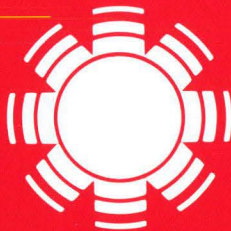
May 1979

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**Test and Measurements
Support Services
Program**

**Program Quarterly
Status Report
For Period
January 1, 1979—March 31, 1979**

Neil D. Kelley



SERI

Solar Energy Research Institute

A Division of Midwest Research Institute

1536 Cole Boulevard
Golden, Colorado 80401

Operated for the
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TEST AND MEASUREMENTS SUPPORT
SERVICES PROGRAM

PROGRAM QUARTERLY STATUS REPORT
FOR PERIOD
JANUARY 1, 1979 - MARCH 31, 1979

NEIL D. KELLEY

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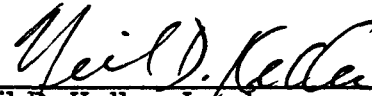
Prepared for the
U.S. Department of Energy
Contract No. EG-77-C-01-4042

PREFACE

This document contains a review of the status of the Test and Measurements Support Services Program (3900 Series Tasks) for the second quarter of FY79.

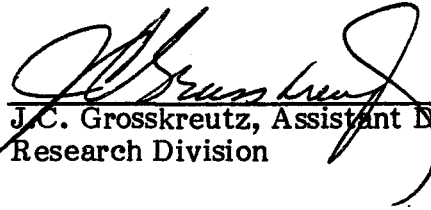
The program is funded by the Energy Technology Division of the DOE. M. Gutstein is the DOE Program Coordinator. Neil Kelley, Leader, Test and Measurements Group, is both the SERI Program Coordinator and Leader. The Test and Measurements Group of the SERI Research Division operates this program.

Questions for FY79 concerning the Test and Measurements Support Program may be addressed to Neil Kelley at FTS 327-1221.



Neil D. Kelley, Leader
Test and Measurement Support
Services Program
Solar Energy Research Institute

Approved for:
SOLAR ENERGY RESEARCH INSTITUTE



J.C. Grosskreutz, Assistant Director
Research Division

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SECTION 1.0

PROGRAM OVERVIEW

1.1 PROGRAM OBJECTIVES

The Test and Measurements Services (TMS) Program has been initiated to implement a coordinated scientific data management program prior to and at the outset of SERI research activities. Specific objectives include establishing a well-integrated analytical data management system which effectively shares costly resources such as data acquisition hardware, software development services, instrumentation and meteorology services, and test facility operating equipment and personnel.

The TMS program has been divided into five tasks:

- Program Planning and Administration (3920);
- Real-Time Data Acquisition, Processing, and Control Services (3921);
- Instrumentation Calibration and Maintenance Services (3924);
- Test Facility Support (3927); and
- Measurement Development Services (3930).

The major thrusts of the FY79 program have been twofold: (1) establishing the basic facilities necessary to furnish scientific data management and operational services planned during FY78; and (2) furnishing of a limited range of instrumentation and test support services.

1.2 VARIANCES

Overall program expenditures to date are significantly higher than originally planned, particularly in Tasks 3921 and 3927. Labor costs have exceeded the phased budgeted amount as a result of a higher labor use rate and an overhead rate significantly higher than was planned for the fiscal year. Further, direct technical costs for Test and Measurements support of establishing the Omnium-G test and evaluation project have exceeded original estimates due to unforeseen changes in this program.

1.3 PROGRAM SUMMARY ASSESSMENT AND FORECAST

The higher-than-programmed expenditures for labor and direct technical costs will require the internal reprogramming of funds originally allocated for subcontracts into these categories. Annual program costs are not expected to exceed the FY79 budget authority, however.

SECTION 2.0
TASK STATUS REPORTS

PROJECT STATUS REPORT

Period Covered: January 1 - March 31, 1979
Task Title: Program Planning and Administration
Task Number: 3920

Date: April 4, 1979
Prepared by: N. Kelley

CONTRACT OBJECTIVE CHANGES: None

TECHNICAL APPROACH CHANGES: None

ACHIEVEMENTS:

Initial budgets for operating expenses and capital equipment expenditures for FY80 were prepared and submitted to SERI management.

Quarterly Review of Test and Measurements program was prepared and presented on January 18, 1979 to Howard Coleman and Robert San Martin.

The Test and Measurements Program has participated in the development of the SERI Institutional Planning.

PROBLEMS/VARIANCES: Cost variances: See program overview.

OPEN ITEMS: None

SUMMARY ASSESSMENT AND FORECAST: FY80 initial budgets reflect the planned growth in the Measurement Development and Field Test Support areas. The role of the Test and Measurements Area will be defined within the structure of the SERI Institutional Plan and will not appear as a distinct program area after FY79. An internal reprogramming of funds will be necessary to ensure adequate support for the remainder of FY79 for the Test and Measurements Program.

PROJECT STATUS REPORT

Period Covered: January 1 - March 31, 1979
Task Title: Real Time Data Acquisition, Processing
and Control Services
Task Number: 3921

Date: April 2, 1979
Prepared by: John Houkal

CONTRACT OBJECTIVE CHANGES: None

TECHNICAL APPROACH CHANGES: None

ACHIEVEMENTS:

In collaboration with two outside consultants, the configuration for the SERI Research Data Acquisition System (SERDAS) was finalized. In compliance with DOE directive 1360.1, an implementation plan draft was developed to support this configuration. This draft was reviewed informally. Problems and deficiencies in the original draft were identified and a second, greatly revised draft was produced. This revised draft is currently in an informal review cycle. Work has begun on the RFP for the major components in SERDAS. The detailed design of SERDAS is continuing.

An interim data acquisition system, based on a H-P 9845 desk-top computer, has been developed and installed at the Field Test Site to support the ACRES (Omnium-G) project. The data acquisition system is working well, but noise on the signal lines is severely limiting measurement accuracy. The source of this noise has been identified and corrective actions are being taken.

Development of the permanent data acquisition and control system, based on a DEC LSI-11 microcomputer, for the ACRES (Omnium-G) project has begun. Design of the data acquisition and control program was finalized, and necessary low-level software (i.e., device drivers, bit manipulation routines, etc.) was written. Production of the high-level software has started.

System integration (hardware and software) of the DEC LSI-11 microcomputers is complete. These computer systems will be used extensively at the Field Test Site for experiment support. The lack of familiarity with the LSI-11 systems has hampered progress in the past. Recent experience with these systems will allow more efficient and effective utilization.

Jointly with the Thermal Conversion Branch, the detailed design of the experimental system for Solar Energy Research and Applications in Process Heat (SERAPH) was undertaken and partially completed. This work resulted in the preparation of the SERAPH project report and various other technical specifications. Facilities at Sandia Laboratories, being similar to SERAPH, were visited in order to gain first-hand information on collector control techniques. Definition of control requirement for ACRES (Omnium-G) was begun.

PROBLEMS/VARIANCES: See program overview.

OPEN ITEMS: None

SUMMARY ASSESSMENT AND FORECAST:

The implementation plan for SERDAS will be submitted for SERI approvals and subsequently for DOE action in April. The RFP for the major components in SERDAS will be completed by early May. The microcomputer-based data acquisition system for ACRES (Omnium-G) will be operational in April. Development of software to support the South Table Mountain Baseline Study project and Insolation Research Facility (IRF) will begin in May. Detailed design of SERAPH will continue with additional technical specifications being produced.

PROJECT STATUS REPORT

Period Covered: January 1 - March 31, 1979
Task Title: Test & Calibration Services
Task Number: 3924

Date: April 3, 1979
Prepared by: C. Wells

CONTRACT OBJECTIVE CHANGES: None

TECHNICAL APPROACH CHANGES: None

ACHIEVEMENTS:

During this second quarter of FY79, the following have been achieved:

1. Significant insight gained and progress made in solar radiation instrument intercomparison techniques, definitions, and measurement quality qualification.
2. All or most of the equipment has been ordered (and some received) in the areas of general purpose testing, electrical calibration and standards, and vibration measurements. Some test and calibration capabilities are now operating in temporary laboratory space.
3. A specially constructed electromagnetic shielding wall has been installed, connected to the RF grounding system, and inspected and approved. Specifications have been completed and an RFQ let for the RF shielded room in the calibration laboratory.
4. First phase of program operating between Test & Calibration Services and Procurement Branch which documents receipt and acceptance testing of capital equipment before payment of invoice.
5. Junior Test & Calibration Technician hired and functioning well in the group.
6. Support has been given during this quarter to each Research Division branch, the Technology Commercialization Division, and the International Programs Branch. Support was in the form of experiment, laboratory, and equipment planning and/or specification; calibration and repair; subcontractor review; and tutorial session development.

PROBLEMS/VARIANCES:

1. Funds are just now being released for ordering equipment in the second quarter for optical pyrometry, solar radiometry, general purpose testing, optical references, and temperature. Ordering should be completed in the third quarter with delivery completed in third and fourth quarters.
2. Equipment in the areas of frequency and time-of-day reference system and the automatic measurement system have been held up principally for a final configuration of the Data Acquisition, Processing, and Control System (SERDAS). Ordering in these areas will now move ahead and should be nearly on schedule by the end of third quarter.

3. Since the occupancy of the Interim Lab Building is running over three months later than targeted when the Implementation Plan was drawn up, the time at which each test and calibration capability is fully functional and proven will be delayed by about the same amount of time.

OPEN ITEMS: None

SUMMARY ASSESSMENT AND FORECAST:

1. During the next quarter, principal objectives will be completion of move into new building, equipment ordering, establishment of calibration and test capabilities, procedure development and refinement, and development of a smooth-running team.
2. Establish the relation of our solar insolation measurements to international measurement scales through participation in Second International Comparison of Absolute Cavity Radiometers, May 1-4, 1979 in Phoenix, Arizona.
3. Lead Test & Calibration Specialist offer to be let, ready for start June 1.

QUARTERLY PROJECT STATUS REPORT

Period Covered: January 1 - March 30, 1979
Task Title: Test Facility Support Services
Task Number: 3927

Date: April 2, 1979
Prepared by: Ed McKenna

CONTRACT OBJECTIVE CHANGES: None

TECHNICAL APPROACH CHANGES: None

ACHIEVEMENTS:

1. Layout of the Interim Field Site, implementation and update for building and utility requirements were completed.
2. A cost estimate for complete construction of the SERI Interim Field Site was completed. This estimate was compiled to cover the utility services needed to complete the task requirements.
3. Provided Thermal Branch "Omnium-G" experiment with electrical power, signal data collection and reduction services.
4. Installation of South Table Mountain Met Tower for Energy Resource Assessment Branch completed. Coordination and installation provided through this task.
5. Examining and evaluation of DOE owned surplus equipment as to feasibility of being used at the Interim Field Test Site. The newest addition will be a five-room mobile home that General Electric Co. under contract #EY-76-C-02-2705 (Mod 1) has equipped for solar heating and cooling. This mobile home trailer will provide the office space needed for the Test and Measurement Group Interim Field Site operations.

PROBLEMS/VARIANCES:

1. High-intensity external electromagnetic fields from radio and TV transmitting towers on Lookout Mt., Golden, Colo. Expect to minimize problem shortly by improved instrumentation grounding and shielding techniques.
2. Cost variances: See program overview.

OPEN ITEMS: None

SUMMARY ASSESSMENT AND FORECAST:

This task is continuing to supply the support and coordination needed and requested by the SERI Research Branches.

Generally, task activities in the project areas are proceeding on schedule. The procurement of some engineering services from outside sources (relative to a specific project) have been delayed somewhat because of instrumentation problems. From a technical standpoint, overall task-related project activities are proceeding well. Minor scheduling problems will be corrected through the coordination with the subcontractor. Followup and monitoring of work progress will be continued in all active areas.

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RESEARCH REPORT
NREL/TP-430-4230

Final Report

Prepared for the
U.S. Department of Energy

