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DOE/NASA CONTRACTOR
REPORT

DOE/NASA CR-150854

PROTOTYPE SOLAR-HEATED HOT WATER SYSTEMS AND DOUBLE-
WALLED HEAT EXCHANGERS (Progress Report)

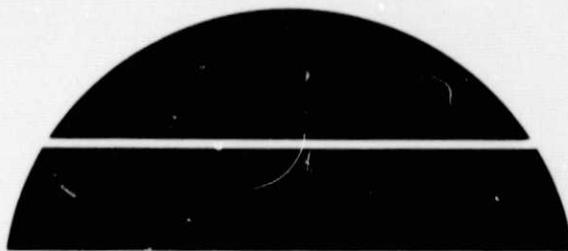
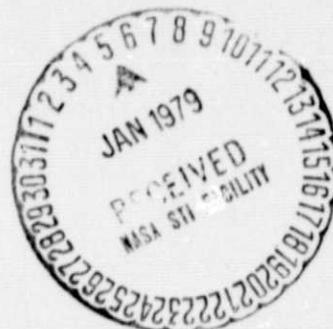
Prepared from documents furnished by

Elcam, Incorporated
5330 Debbie Lane
Santa Barbara, CA 93111

Under Contract NAS8-32245 with

National Aeronautics and Space Administration
George C. Marshall Space Flight Center, Alabama 35812

For the U. S. Department of Energy



U.S. Department of Energy



Solar Energy

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16. ABSTRACT This report is a collection of quarterly and monthly reports from Elcam, Inc., covering progress made from January 1, 1978 through September 30, 1978. Elcam, under NASA/MSFC Contract NAS8-32245, is developing two solar-heated hot water prototype systems and two heat exchangers. This effort consists of development, manufacture, installation, maintenance, problem resolution, and system evaluation. The reports have been reformatted, pages renumbered and the cost information removed. For additional progress reports, see NASA/DOE CR-150691.					
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SIXTH QUARTERLY REPORT

CONTRACT NAS8-32245

ELCAM, INC.

April 18, 1978

I. SUMMARY

The Sixth Quarterly Report covers the period from January 1 through April 13, 1978. It reports on the schedule status and technical performance of the subject contract.

II. CONTRACT

During the Sixth Quarter, the Tempe-OTS was modified as follows:

1. W300 was replaced with an accumulating flow meter.
2. W100 and W101 were cleaned and replaced.
3. T204 was relocated to the storage tank top.
4. The vacuum relief valve was replaced with a vacuum relief/air vent valve.
5. The tempering valve was removed.
6. The autocontrol collector sensor was moved inside the collector.
7. T102, T103 and T104 were relocated inside the collector in an attempt to calibrate T105. Two of these sensors appear to have failed.

An unexplained period of zero flow occurred from 3-14-78 through 3-17-78. Following this period, good data has been recorded although no maintenance action has been taken.

In April, the San Diego-OTS was installed. This system includes several improvements compared to the Tempe equipment:

1. The collectors have tempered glass covers.
2. The system plumbing is significantly simplified.
3. The autocontrol is the new Model #150 for which a U.L. listing is

Sixth Quarterly Report

April 18, 1978

expected to be obtained at additional expense to the contractor.

The Sixth Quarterly Review was held at the San Diego-OTS following its successful installation and acceptance by the Technical Director.

The U.L. testing program proceeded with fire and structural testing of the collector in Northbrook, Illinois, and electrical testing of the autocontrol in Santa Clara, California. The fire testing resulted in failure because of the flammable nature of the acrylic cover. The structural testing verified the capability of the collector to withstand generally accepted loads although failure occurred prior to the applied loads reaching their preassigned criteria levels.

Electrical testing is not yet complete; however, May 9 has been established as a completion date for this segment of the U.L. program.

The finned test report was completed late in the subject reporting period.

The following contract modifications were received during the sixth quarter:

1. Supplemental Agreement #6
2. Supplemental Agreement #7
3. C.P.-14 (or C.P.-15 and C.P.-16) Routine Maintenance at both O.T.S.'s.
4. C.P.-17, Special Sensor Replacements (TEMPE)
5. C.P.-18, Collector Cover Material Change (SAN DIEGO)

The following Change Proposals are outstanding:

1. C.P.-19, Waiver of Certain Certification Requirements

III. SCHEDULE

The contract is on schedule as amended by Supplemental Agreement #7.

IV. TECHNICAL PERFORMANCE

A. Work Accomplished

Work performed during the Sixth Quarter included:

1. One OTS (Tempe) visit to perform sensor replacement and minor

Sixth Quarterly Report

April 18, 1978

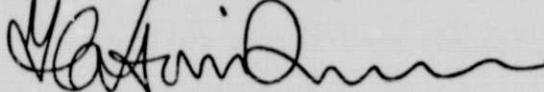
system plumbing modifications.

2. Monitor Tempe-OTS data.
3. Receipt of preliminary U.L. test program results.
4. Planning and execution of San Diego-OTS installation.
5. Completion of finned tube test report.
6. Sixth Quarterly Review.

B. Problem Areas

No outstanding problem areas have been identified. The cause of the questionable data from Tempe-OTS remains unexplained.

Respectfully submitted,



Terence C. Honikman
Principal Investigator

TCH:jjw

SEVENTH QUARTERLY REPORT

CONTRACT NAS8-32245

ELCAM, INC.

July 10, 1978

I. SUMMARY

This Seventh Quarterly Report covers the period from April 14, 1978 through June 30, 1978. It reports on the schedule status and technical performance of the subject contract.

II. CONTRACT

During the Seventh Quarter, the Tempe OTS was modified as follows:

1. Three collector temperature sensors were replaced.
2. The collector insulation doublers were removed.
3. The circulation pump was replaced to permit its inspection.

The San Diego OTS was modified as described in detail in the May status report. Both OTS appear to be performing satisfactorily and there are no outstanding service calls or planned modifications to the contractor supplied equipment. The gas flow meter installed on the San Diego OTS may yet require modification by the instrumentation contractor.

The following reports were prepared during the Seventh Quarter:

ESC-37	Testing Program Performed By Underwriter's Laboratories
ESC-38	SUNSPOT Collector Rack Structural Analysis
ESC-39	Approximate SUNSPOT Collector Performance Modifiers for Off-Optimum Orientations at or Near Latitude 34°

CP-19, Waiver of Certain Certification Requirements, and CP-21, Maintenance Reporting, remain outstanding.

Seventh Quarterly Report

July 10, 1978

III. SCHEDULE

The contract is on schedule as amended by Supplemental Agreement #7.

IV. TECHNICAL PERFORMANCE

A. Work Accomplished

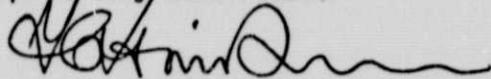
Work performed during the Seventh Quarter included:

1. Monitor Tempe OTS
2. Install San Diego OTS
3. Contractor visit to U.L. facilities
4. Correct San Diego OTS installation problems
5. Government acceptance of San Diego OTS
6. Completion of U.L. test program including Elcam report #ESC-37, Testing Program Performed By Underwriter's Laboratories, Inc.
7. Perform minor modifications at Tempe OTS - see CP-20 for details
8. Monitor San Diego OTS
9. Prepare Elcam reports #ESC-37, Testing Program Performed By Underwriter's Laboratories, ESC-38, SUNSPOT Collector Rack Structural Analysis, and ESC-39, Approximate SUNSPOT Collector Performance Modifiers for Off-Optimum Orientations at or Near Latitude 34°.

B. Problem Areas

No identified problems remain outstanding.

Respectfully submitted,



Terence C. Honikman
Principal Investigator

TCH:jjw

MONTHLY STATUS REPORT

CONTRACT NAS8-32245

ELCAM, INC.

MONTH OF JULY 1978

I. WORK PERFORMED

A. TEMPE OTS

The data received from the Tempe OTS continued to be satisfactory. We received a phone call from the site on July 31, reporting that W101 (Channel 5) had been stepped on and broken. The flow meter was isolated from the system and the Cascade mode deactivated. The system is now operating as a pre-heater. NASA and IBM were notified and a replacement flow meter was requested.

B. SAN DIEGO OTS

The data received from San Diego was satisfactory. No service calls were received. The system appears to be in working order.

II. WORK SCHEDULED

A. Monitor Tempe OTS

Replace W101 flow meter when we receive a replacement for the broken sensor.

B. Monitor San Diego OTS

III. CONTRACT MODIFICATIONS

No contract modifications were received during the Month of July 1978.

IV. PROPOSED CONTRACT MODIFICATIONS

No contract modifications were proposed during the month of July 1978.

MONTHLY STATUS REPORT

CONTRACT NAS8-32245

ELCAM, INC.

MONTH OF AUGUST 1978

I. WORK PERFORMED

A. TEMPE OTS

The data received from Tempe OTS continued to be satisfactory. The system remains in the preheater mode due to a broken flow meter. (See July 1978 report.)

The solar portion of the system was turned off on August 31 to conduct a collector stagnation test on September 1. The system was reactivated September 2nd. The results of the stagnation test will be seen when the August/September data comes in.

B. SAN DIEGO OTS

The data received from San Diego was satisfactory. No service calls were received. The system appears to be in working order.

II. WORK SCHEDULED

A. Monitor Tempe OTS

Replace W101 flow meter when we receive a replacement for the broken sensor.

B. Monitor San Diego OTS

III. CONTRACT MODIFICATIONS

No contract modifications were received during the month of August, 1978.

IV. PROPOSED CONTRACT MODIFICATIONS

No contract modifications were proposed during the month of August, 1978.

MONTHLY STATUS REPORT

CONTRACT NAS8-32245

ELCAM, INC.

MONTH OF SEPTEMBER 1978

I. WORK PERFORMED

A. TEMPE OTS

The data received from Tempe OTS through 9/6/78 continued to be satisfactory. The system remains in the preheater mode due to a broken flow meter. (See July 1978 monthly status report)

B. SAN DIEGO

The data received from San Diego was satisfactory. No service calls were received. The system appears to be in working order. Data was received through 9/7/78.

II. WORK SCHEDULED

A. Monitor Tempe OTS

Replace W101 flow meter when we receive a replacement for the broken sensor. The replacement sensor was sent to the University in Tempe and is now being routed to us.

B. Monitor San Diego OTS

III. CONTRACT MODIFICATIONS

A. Article XIV of the GENERAL PROVISIONS, Paragraph B., Subparagraph 2 was amended to add New Technology Long Form (Nov. 1977)

B. Paragraph 4.2 CERTIFICATION in Exhibit "A", Statement of Work was deleted and new test agency data was added.

Both contract modifications were dated 9/28/78.

IV. PROPOSED CONTRACT MODIFICATIONS

No contract modifications were proposed during the month of September, 1978.