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DOE/NASA CONTRACTOR REPORT

DOE/NASA CR-150851

INSTRUMENTATION AT THE "DECADE 80" SOLAR HOUSE IN TUCSON, ARIZONA (Collation of Monthly Reports)

Prepared from documents furnished by

Copper Development Association, Inc.
405 Lexington Avenue
New York, NY 10017

Under Contract NAS8-32244 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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This work was done under the technical management of Mr. Mitchell Cash, George C. Marshall Space Flight Center, Alabama.

16. ABSTRACT

This report contains the status of the instrumentation system at the "Decade 80" solar house. It describes the modifications, problems and solutions that occurred during the period from May through September 1978.

The "Decade 80" solar house, located in Tucson, Arizona, was built by the Copper Development Association, Inc., to show the use of copper in home building and to demonstrate the use of solar energy to provide space heating and cooling and domestic hot water. The auxiliary energy sources are electrical resistance heating for the domestic hot water and a gas-fired boiler for space heating and operation of the absorption air conditioning units. The program to instrument the "Decade 80" solar house and to acquire performance data on the system began in November 1976.

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405 Lexington Avenue, New York, N.Y. 10017 COPPERDEV NEW YORK (212) 953-7300

July 7, 1978

Mr. Mitchell C. Cash (Mail Code FA32)
NASA George C. Marshall Space Flight Center
Marshall Space Flight Center, Alabama 35812

Dear Mr. Cash:

Monthly Status Report No. 17
CONTRACT NAS8-32244

During May the SDAS data collection project at the Decade 80 Solar House operated with only the following notable incidents:

May 8 - Work began to remove the Arkla 501-WF direct air conditioning machines for replacement with Arkla WF-36 chillers and to accomplish other system improvements. Accordingly, the heating and cooling system was shut down to be started up again upon completion of the system improvement program.

- The SDAS was shut down for about 2.5 hours on May 8, as various sensors were disconnected. A few sensors will remain connected and be supplying data to the SDAS throughout the shut-down period.

May 9 - The SDAS was off for 3 to 4 hours while flow sensors were disconnected.

May 10- The SDAS was off for about 1.5 hours.

May 16- The pyronometer glass cover was wiped with a tissue in the early a.m.

May 26- Piping connections were made so that the collector would heat the swimming pool through Heat Exchanger HE3, for the period while the storage tank was out of service for modifications.

- The SDAS was turned off at 8 a.m. to be restarted at 8:30 a.m. on the 30th.

May 30 - An inner pane of one of the glass panels on the roof (over the east zone) broke either on the 30th or the 31st.

Sincerely,

W. Stuart Lyman, Manager
Technical & Market Services

WSL:mfg

copper development association inc.

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July 20, 1978

Mr. Mitchell C. Cash (Mail Code FA32)
NASA George C. Marshall Space Flight Center
Marshall Space Flight Center, Alabama 35812

Dear Mr. Cash:

Monthly Status Report No. 18
CONTRACT NAS8-32244

During June the SDAS system at the Decade 80 Solar House was essentially out of operation due to the extensive system improvement program underway at the site. Although nearly all of the sensors were active only the measurements associated with the collector and the weather were valid throughout the month.

June 12 - Tentative conclusions were reached with the Associate Contractor reading sensor locations in the up-graded system.

June 16 - The storage tank opened, drained and inspected. (It was noted that the 1.3-inch by 6-foot long magnesium anode had been completely consumed. The anode model chosen for replacement had a 100 ohm built in resistor to limit the current and slow the anode wastage.)

June 21 - An inner pane of glass broke when the collector pump was restarted after a shutdown period.

June 26 - A 50-foot 1-inch diameter copper tube coil, to heat the domestic water, was installed in the storage tank. The tank was re-filled and closed.

Sincerely,

W. Stuart Lyman, Manager
Technical & Market Services

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copper development
association inc.

405 Lexington Avenue, New York, N.Y. 10017 COPPERDEV NEW YORK (212) 953-7300

August 10, 1978

Mr. Mitchell C. Cash (Mail Code FA32)
NASA George C. Marshall Space Flight Center
Marshall Space Flight Center, Alabama 35812

Dear Mr. Cash:

Monthly Status Report No. 19
CONTRACT NAS8-32244

During July the SDAS system at the Decade 80 Solar House was essentially out of operation due to the extensive system improvement program underway at the site. Although nearly all of the sensors were active only the measurements associated with the collector and the weather were valid throughout the month.

July 26 - Discussions were held with the Associate Contractor regarding the location of two flow transducers, W300 (domestic hot water) and W504 (chilled water). Other sensor locations have been established.

Sincerely,

W. Stuart Lyman, Manager
Technical & Market Service

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copper development association inc.

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September 29, 1978

Mr. Mitchell C. Cash (Mail Code FA32)
NASA George C. Marshall Space Flight Center
Marshall Space Flight Center, Alabama 35812

Dear Mr. Cash:

Monthly Status Report No. 20
CONTRACT NAS8-32244

During August the SDAS system at the Decade 80 Solar House began to transmit useful data again, following the extensive improvement program underway at the site.

The following incidents related to system performance occurred during the month:

August 1 - Pump P-3 coupling broke

August 2 - Pump P-3 coupling repaired

August 10 - Power to pumps P-3 and P-4 were re-wired so they can be metered separately in the future.

August 11 - New instrumentation list sent to Project Manager and to Associate Contractor.

August 15 - Heating/cooling subsystem piping was insulated.

August 22 - Lithium bromide charge solution in each new Arkla chiller was adjusted by Arkla representative to provide lower firing temperature.

August 23 - Two broken collector glazing panels were replaced.

August 24 - New watt transducers and temperature sensors were received from the Associate Contractor.

Sincerely,

W. Stuart Lyman, Manager
Technical & Market Service

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association inc.

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October 31, 1978

Mr. Mitchell C. Cash (Mail Code FA32)
NASA George C. Marshall Space Flight Center
Marshall Space Flight Center, Alabama 35812

Dear Mr. Cash:

Monthly Status Report No. 21
CONTRACT NAS8-32244

During September the following incidents related to the SDAS system performance occurred:

(August 31	Collector pump P-1 fuse blew)
September 31	Flow sensors W502 and W503 were removed and cleaned. Debris from system alterations work had accumulated on them and was impeding water flow.
September 9	West Zone fan coil blower found to be seriously out of balance when started up for first time. Removed for balancing.
September 18	Specifications for sensors W300 and W504 were given to the Associate Contractor.
September 21-September 25	West Zone fan coil blower replaced. SDAS turned off for 6 to 8 hours during connection of new flow and temperature sensors.
September 25	Both zones cooling properly.
September 27	Piping insulation completed
September 28	New tubing installations (generator, chilled water, fan coil) were flushed with warm aqueous citric acid solution to remove debris (e.g. residual flux) from system alterations work.

Sincerely,

W. Stuart Lyman, Manager
Technical & Market Services

WSL:mfg

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