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CONTINUOUS CZOCHRALSKI GROWTH: SILICON SHEET GROWTH
DEVELOPMENT OF THE LARGE AREA SILICON SHEET TASK OF THE
LOW COST SILICON SOLAR ARRAY PROJECT

Eleventh Quarterly Progress Report, July 1-September 30, 1980

By
B. R. Bezio

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SILICON SHEET GROWTH DEVELOPMENT
OF THE LARGE AREA SILICON SHEET TASK
OF THE LOW COST SILICON SOLAR ARRAY PROJECT

ELEVENTH QUARTERLY PROGRESS REPORT
JULY 1, 1980 - SEPTEMBER 30, 1980
PROGRAM MANAGER: DR. R. L. LANE
PROGRAM INVESTIGATOR: B. R. BEZIO

KAYEX CORPORATION
1000 MILLSTEAD WAY
ROCHESTER, NEW YORK 14624

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I INTRODUCTION

Process development work on this contract was completed March 31, 1980. JPL issued unilateral modifications to the project for design modifications to a Hamco CG2000 RC crystal grower to satisfy the 1982 Technology Readiness goals.

The modifications required the capability of growing a minimum of five silicon crystals, each of 30 kg weight, at a diameter of 150 mm from a 16-inch crucible.

The design modifications include:

- A. Overall equipment design;
- B. Process automation with microprocessor controls;
- C. Recharge rate of greater than 25 kg per hour with a capability of recharging silicon in chunks or grain form;
- D. Modified growth chamber suitable for use as a production facility with a throughput capability of greater than 3 kg per hour of machine operation.

II PROGRESS

The conceptual plan was completed and work proceeded on the overall equipment design.

Design modification requirements include:

- 1. 15 and 16 inch hot zones;
- 2. Larger furnace tanks:
 - inside diameter - 27"
 - tanks' height - 42";
- 3. Taller pull chamber - 10" taller;
- 4. 50 kg rated seed mechanism;
- 5. Bellows seal crucible lift mechanism;
- 6. Viewports for sensor development;

7. Microprocessor interface for automation;
8. Baseplate and frame - 48" deep, to accommodate the larger chambers;
9. 150 kw power supply.

By the end of the quarter, the hot zones, pull chamber system, furnace tanks, baseplate, frame, and power supply were complete and released for quotation.

The Seed Lift Mechanism design was underway and the modifications to the electrical console were started.

The program plan was revised to enable potential long lead items to be designed first.

The ancillary systems (e.g. water cooling, argon, vacuum, and recharge hopper) were scheduled for October and November.

III PROGRAM PLAN

The design phase of a modified CG2000 RC crystal grower for Technology Readiness is proceeding on an accelerated schedule. An updated program plan is included in Figure 1.

DESIGN PHASE FOR MODIFIED CG2000 RC
FOR ADVANCED CZOCHRALSKI GROWTH
FOR TECHNOLOGY READINESS

PROGRAM PLAN

JPL CONTRACT #954888

WEEK ENDING

Figure 1