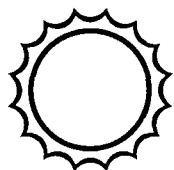


1184



Sandia Laboratories
Solar Energy



San Francisco
Operations
Office

SOLAR THERMAL POWER

**Large
Power
Systems
Applications**

**STATUS LETTER FOR
DECEMBER 1979**

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PROGRAM ELEMENT SUMMARY

CENTRAL RECEIVER SYSTEMS

This report, issued monthly, covers the portion of the Solar Thermal Power Systems Program which is directed toward large-scale systems applications -- primarily Central Receiver system applications to electrical power generation at 10 MWe and above, but also with consideration of direct, high temperature thermal applications and of alternative collector configurations. The Central Receiver concept employs a field of individually guided mirrors called heliostats that redirect the sun's energy to a receiver mounted on top of a tower. In the receiver, the radiant solar energy is absorbed in a circulating fluid and is then transported to an electrical power generation subsystem or to an industrial thermal process; excess thermal energy may be stored for later use, if operationally desirable and economically justifiable. Alternative systems for large-scale energy collection, such as linear central receivers with single-axis heliostats and individual, distributed collectors in manifolded arrays, are also under study.

Responsibility for managing the development and assessment of large solar thermal power systems for various applications has been delegated by DOE Headquarters to the San Francisco Operations Office. Technical management is drawn from Sandia Laboratories, Livermore, the Aerospace Corporation, and other public and private organizations. The Large Power Systems Applications program element is organized according to a work breakdown structure which includes: Overall planning and coordination activities; storage-coupled systems; utility repowering/industrial retrofit systems; solar/non-solar hybrid systems; and programmatic support to the 10-MWe Solar Thermal Pilot Plant construction project.

"Pending approval of the Central Receiver Systems Program Annual Operating Plan for FY80, this report will continue to follow the format and work breakdown structure established for FY79."

MILSESTONES/HIGHLIGHTS

- Approval of the Fiscal Year 1980 AOP was forwarded December 21 from HQ. A revision to the September 19, 1979 APP, reflecting agreements reached on allocation of FY80 funding, is in preparation and will be submitted next month. (See CRS Fiscal Status.)
- The Aerospace support service contract is being finalized.
- A pictorial display of the repowering/industrial retrofit projects has been prepared and shipped to DOE headquarters. A duplicate display will be prepared for use at meeting's including the next semi-annual meeting in Albuquerque on March 19.
- An Energy Foundation of Texas (EFT) unsolicited proposal entitled "Characterization of Heliostat Vortex Shedding" is in the early stages of procurement.

MILESTONES MISSED

- None

PROBLEMS

- None

ACTIVITIES FOR JANUARY AND FEBRUARY

- Repowering midterm reviews are planned for February and March but the dates and locations are not yet settled.

Reserved Funds
Unsolicited Proposals
(WBS 01.01.02)

SRI Mesoscale Weather Study. This effort has been further extended at no additional cost, to permit more careful review of interim model outputs, and to permit better specification of plant characteristics from ongoing conceptual design studies. The Final Report is now scheduled for delivery March 31, 1980.

Central Receiver Systems Development
(WBS 01.00.00)

Northrup: A significant study by Northrup has determined that a single tower central receiver system is more cost effective than the multiple towerless modules at Arco's North Coles Levee site. The primary problem with the modules is that the cost of interconnecting piping is estimated higher than the cost of a single tower.

Westinghouse Value Analysis: The midterm technical review of the Westinghouse economic assessment of advanced solar-thermal power systems was held at Sandia Livermore on December 11, 1979. Preliminary modeling results of several solar central receiver systems (standalone & hybrid) were presented. These initial indications show lifetime cost/value ratios of 0.5 to 0.9 for a variety of hybrid and standalone plants located in areas of the country where insolation is good and where premium fuel (gas & oil) consumption contributes substantially to the utility generation mix. Texas, Oklahoma, and the Southwest fit into this category. Additional work, before the end of the study in May, will study the sensitivity of the results to: type of generation mix of the utility, amount of sunshine, amount of storage, size of heliostat field, type of hybrid or standalone plant, and amount of solar plant penetration into the utility grid.

Steam Working Fluids; Electric Generation
(WBS 01.01.02)

El Paso Electric Solar Feedwater Heating Study. Computer difficulties have further delayed the submission of the Topical Report on the Phase I review of the proposed design for EPE's Rio Grande Station Unit 8; the report is now scheduled for early January, 1980. Continuation of the work into the Phase II industry survey and application assessment is contingent upon favorable review of this report. This decision was rescheduled for early February, 1980.

El Paso Repowering Study. El Paso Electric Company held their first Utility Advisory Committee meeting on December 12 in El Paso. Twenty-six utilities were represented as well as the Texas Governor's office. The committee will be kept apprised of the project progress and will meet again near the contract completion in 5 or 6 months. El Paso Electric plans to use the committee as a sounding board for their design concepts, receiving valuable inputs from a spectrum of utilities in exchange for some solar education.

Steam/Cogeneration Systems
(WBS 01.01.03)

Fort Hood Solar Central Receiver Total Energy System. On December 13, both American Technological University and the American Educational Complex Research Institute (ATU's corporate research establishment) submitted notice to SAN that they are withdrawing their proposal for conceptual redesign of the Ft. Hood barracks Solar TES. Procurement action at SAN was immediately terminated on the ATU (\$900K against \$1.2M total) and Aerospace technical support (\$246K) awards. Although the major portion of the funds thus freed will be required to meet other CRS/HQ obligations, the revised APP allocates \$400K for alternative Military Solar Central Receiver Cogeneration/TES definition studies. We are presently reviewing options for implementation; at this point it appears most feasible to incorporate this area as a sub-category of the forthcoming cogeneration RFP.

10-MWe Pilot Plant Operations
(WBS 01.03.02)

Prorating of Pilot Plant component spares has indicated that approximately \$100K of operating funds are required for heliostat spares and \$500K+ for other subsystems spares. The revised APP allocates \$100K for the heliostat contract, for which Martin Marietta Corporation (MMC) was selected in early December. The remaining spares will be procured through the Solar Facilities Design Integrator, McDonnell Douglas; more accurate figures will be provided in the SFDI Phase II proposal, due in June 1980, and all (or at least the major part of) this procurement will be deferred into FY81.

IEA-SSPS Central Receiver Project
Project Office Funding
(WBS 01.04.01)

IEA Central Receiver SSPS Heliostats. Meetings were held with Wilfried Grasse and Wolf von Kreis of DFVLR, the Operating Agent for the Small Solar Power Systems (SSPS), regarding procurement of heliostats. It was decided to procure 93 heliostats from Martin Marietta Corp, as a portion of the 1956-heliostat Pilot Plant production run. A ceiling price of \$1,073,313 has been negotiated for the heliostats; approximately \$65-70K more is needed for spare parts. It is recommended that \$1.15M be transferred to SAN from the amount reserved at HQ for the FY80 U. S. contribution, to be applied with the \$100K for Pilot Plant operating spares. These cost figures do not include the cost of the glass or packaging and shipping to the mirroring company for the IEA heliostats. The total DOE cost for the IEA heliostat procurement is estimated to be \$1.2M

While Mr. Grasse and Dr. von Kreis were in the U. S. they visited MMC and reached an agreement on the scope-of-work and MMC costs for completing their activities required for providing the IEA heliostat field. The operating agent issued a letter-of-intent to MMC for their part of the heliostat field procurement pending final approval by the SSPS Executive Committee (EC) (Jan. 18, 1980).

The operating agent is continuing negotiation with ACEC, a Belgium company, for the data acquisition system (DAS). The DAS procurement is the last major IEA-SSPS procurement outstanding. Ground breaking for the IEA-SSPS is scheduled for January 17, 1980 at Almeria, Spain.

At the last meeting the EC established an International Advisor Group for the initial purpose of assisting the operating agent in developing a "Test and Operations" plan. The group met in Paris in December 1979 to discuss what the participating countries want from the T&O phase of the program. Attendees were asked to review with utilities and industry in their respective countries what should be included in the T&O phase of the program.

MISCELLANEOUS

Resource Data Document Initiated

Sandia, with the help of Bechtel, has initiated the writing of a Solar Central Receiver Resource Data Document. The objective of the document is to provide sufficient data to perform a "first-cut" appraisal of the value of solar central receiver technology for a specific application. This information should be valuable to utility and industrial process heat personnel in the engineering, operations, and planning areas. A draft should be available in April for comment.

Technical Evaluation Started

Sandia has started its technical evaluation of the various solar central receiver technologies; the methodology of the evaluation has been defined. The objective is to guide the expenditure of research and development funds and recommend directions for future projects. Recent contracts in the field of hybrid and advanced water/steam solar systems will be assessed and combined with the results of earlier evaluations and with current market opportunity assessments. It is anticipated that this information would lead to a decision to narrow the breadth of technologies currently being pursued. Completion of the evaluation is planned for April.

SAN LPSA FISCAL STATUS

San Francisco Operations Office: Central Receiver Systems; Unsolicited Proposals

Obligations (B/A): SAN FY80 operating and PE&D obligational authority remained unchanged for December at \$7,100K and \$800K, respectively \$200K was provided in December for capital equipment. Total FY80 B/A thus stands at \$8,100K. Discussions with HQ during the latter part of the month, however, resulted in agreement upon withdrawal of \$900K of operating funds in January to meet other HQ commitments. A revision to the initial APP submitted in September is in preparation to reflect the anticipated new B/A figure(s) of \$6,200K operating, \$800K PE&D and \$200K capital equipment. Additional funds are required (as noted under WBS 1.4, above) for procurement of IEA/SSPS heliostats.

SAN obligations for December were \$595K vs. a planned \$3,290K; cumulative FY80 obligations are \$720K vs. planned \$3,450K. The variance of \$2730K (-80%) is due primarily to holiday-season delays in transmittal and execution of incremental funding modifications on 11 of 12 Repowering/Industrial Retrofit contracts (\$2,369K), plus deferred award of Aerospace Ft. Hood support contract, since cancelled.

Cost Status (B/O): SAN FY80 operating and PE&D costing authority remained unchanged for December at \$7,429K and \$800K, respectively, \$200K was provided in December for capital equipment. Total FY80 B/O thus stands at \$8,429K.

Further delays have been encountered in conversion to and startup of the FORS accounting system; availability date for SAN cost planning and cost status data is at present unknown. (Interim data compilations do not group contract data by BR number, and manual data retrieval is at present not feasible.) Cost charting will be resumed once the FORS system is fully implemented.

OVERALL LPSA OBLIGATION STATUS

U.S. DEPARTMENT OF ENERGY

CONTRACT MANAGEMENT SUMMARY REPORT

FORM DOE 536
(1/78)

FORM APPROVED
OMB NO. 38R-0190

1. Contract Identification LARGE POWER SYSTEMS APPLICATIONS (WBS 1.0)		2. Reporting Period 1 Dec through 31 Dec		3. Contract Number										
4. Contractor (Name and Address) SAN FRANCISCO OPERATIONS OFFICE				5. Contract Start Date N/A										
				6. Contract Completion Date N/A										
7. Months	O	N	D	J	F	M	A	M	J	J	A	S	FY - 80	
9. Cost Status Obligation Status														
a.												Plan Date - 12/5/79***		
Planned												Planned Prior FY8 Obligations		
Actual 12M												\$12,400K		
Authority 10M												Actual Obligations Prior FYs *		
8M												\$11,588K		
6M												Total Estimated Accrued Obligations, FY80**		
4M												\$ 8,100K		
2M														
b. B&R Numbers														
Oper.: AN350001														
PE&D: 3921 000														
\$K, Planned		0	160	3290	700	300	100	1000	0	0	300	800	250	***
Actual		0	125	595										V
Variance		0	35	2695										
Cumulative		0	35	2730										

* Operating plus PE&D

** Operating, PE&D and Capital Equipment

*** Planning base is Annual Procurement Plan submitted 9/19/79 (\$7,900K Oper. & PE&D). APP is under revision to reflect projected final FY80 budget. Obligation Plan will be revised to suit.

FINANCIAL STATUS (SLL)

The Financial Plan dated 11/19/79 for the month of December 1979, authorizes \$2,110K as Budget Authority (BA) for FY-80. Costs to date are \$389K. Reserves for salaries, internal support and other commitments are \$1,448K. This leaves a balance of \$273K.

CONTRACT MANAGEMENT SUMMARY REPORT

FORM APPROVED
OMB NO. 38R-0190FORM DOE 536
(1/78)

1. Contract Identification SOLAR LARGE POWER SYSTEMS APPLICATION		2. Reporting Period 1 Dec through 31 Dec	3. Contract Number AN-35-05-00-0
4. Contractor (Name and Address) SANDIA LABORATORIES, LIVERMORE, CALIFORNIA		5. Contract Start Date FY75	
		6. Contract Completion Date N/A	

7. Months	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	8. FY 80
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9. Cost Status															g. Cost Plan Date 10-1-79		
a.	Planned	2100															h. Planned Costs Prior FYs 8,938K
	Actual	1800															i. Actual Costs Prior FYs 8,991K
	Committed	1500															j. Total Estimated Costs for Contract
		1200															k. Total Contract Value N/A
b. B&R Numbers AN-35-05-00-0																	l. Unfilled Orders Outstanding N/A
Accrued Costs	c. Planned	160	160	160	160	160	160	160	160	170	170	170	172				m. Estimate for Subsequent Reporting Period N/A
	d. Actual	120	156	113													
	e. Variance	40	4	47													
	f. Cum. Variance	40	44	91													

10. Manpower Status (Direct Labor)															e. Manpower Plan Date 10-1-79		
a.	BASE FTE X 12	280															f. Planned Manpower Prior FYs 77 BASE FTE
		240															g. Actual Manpower Prior FYs 77 BASE FTE
		200															h. Total Estimated Manpower for Contract N/A
		160															i. Total Contract Manpower N/A
Manpower	b. Planned	22	22	19	19	19	19	20	20	20	20	20	20				
	c. Actual	19	18	19													
	d. Variance	3	4	0													

MILESTONE CHART

Failure of the film developer at SLL has forced the exclusion of the milestone chart for this month. No missed milestones were reported.

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