LaJET ENERGY COMPANY UPDATE ON SOLARPLANT 1

Monte A. McGlaun

LaJet Energy Company
P. O. Box 3599
Abilene, Texas 79604

LaJet Energy used internal dollars and private funding to design and build SOLARPLANT 1, a solar thermal electric-generating power plant at Warner Springs, California. SOLARPLANT 1 has 700 LEC 460 solar concentrators creating a 4.92-megawatt generating capacity. Superheat steam at 750F and 675 psi is produced to drive two traditional turbine-generator sets. A steam Rankine cycle thermodynamic closed loop process is used to transfer and convert solar energy to electric energy. Since starting operation in January 1985 considerable experience has been gained in plant operation and maintenance techniques. Presently a retrofit is underway on the reflective film for the mirror facets, electronic controls update, and selected drive assembly components. Structural performance in wind loading has been satisfactory; the only structural failures that have occurred were due to manufacturing defects and non-standard loading conditions. Daily start-up procedures represent most of the routine difficulties due to condensate in steam lines that must be dried prior to turbine roll. The most recent change is the installation of two 1 megawatt diesel generator sets with exhaust heat recovery as steam. The recovered heat augments the solar generated steam, increases the net efficiency of the diesel fuel, and permits revenue during night time and inclement weather. Significantly, the recovered heat preheats the turbine and steam headers and establishes condenser vacuum prior to acquisition of the sun by the solar side of the field, thereby, reducing the solar start-up time. The diesel retrofit was made possible by a joint venture between LaJet Energy and Cummins Engine Company.

LaJet ENERGY COMPANY
3130 Antilley Road
P.O.box 3599
Abilene, Tx. 79604
(915) 698 - 8800

HISTORY OF SOLARPLANT 1

Started operation in January 1985

Privately funded

Located near Warner Springs, California
On a 40 acre site within site of Mt. Palomar

Based on the LEC 460 the 7th Model of LaJet Energy's Solar Concentrators

LaJet ENERGY COMPANY
3130 Antilley Road
P.O. box 3599
Abilene, Tx. 79604
(915) 698 - 8800

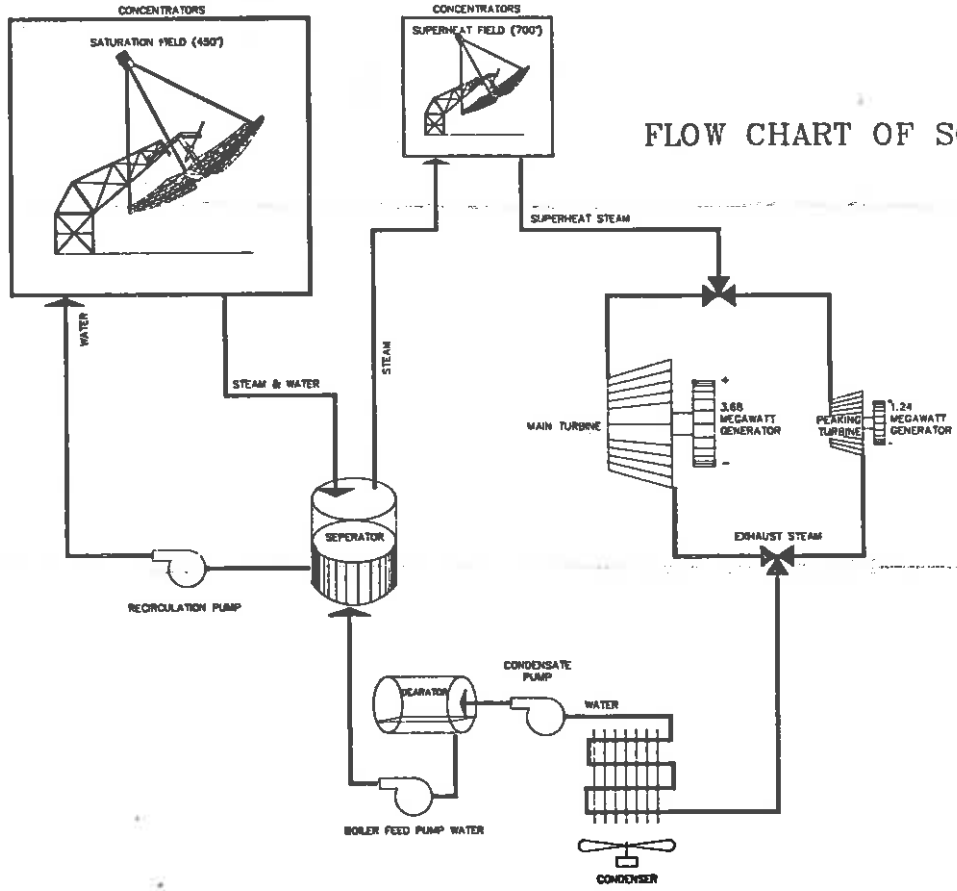
SPECIFICATIONS

700 LEC 460's Arranged in Two Fields:
Saturated (450F) and Superheat (700F)

4.92 Peak Electrical Output
From Two Turbines

Designed Average Electrical Output
12,000,000 kwh/year

FLOW CHART OF SOLARPLANT 1



LaJet ENERGY COMPANY
3130 Antilley Road
P.O.box 3599
Abilene, Tx. 79604
(915) 698 - 8800

SOLARPLANT 1 OPERATIONAL UPDATE

CHANGES TO THE SOLAR SIDE

Receiver redesign and installation to correct faulty welds
Flexible hose material change to resist chloride attack
Electronic & Electrical equipment update
Mirror reflective film change-out with higher strength substrate
Upper declination pivot support assembly change-out

CHANGES TO POWER CONVERSION SIDE

Piping changes to enhance dry-out in morning start-up
by improving drainage and condensate collection

LoJet ENERGY COMPANY
3130 Antilley Road
P.O.box 3599
Abilene, Tx. 79604
(915) 698 - 8800

SOLARPLANT 1 OPERATIONAL UPDATE

OPERATIONAL CHALLENGES

SOLARPLANT 1 is required to start-up the steam system on a daily basis versus most industrial systems which may start-up twice a year.

Weather related delays can last for several days which cause piping to lose all residual heat.

Start-up after several prior days of operation takes 30 to 60 minutes.

Start-up after extended shut-down can take half a day

LaJet ENERGY COMPANY
3130 Antilley Road
P.O.box 3599
Abilene, Tx 79604
(915) 698 - 8800

SOLARPLANT 1 OPERATIONAL UPDATE

CURRENT STATUS

Through a joint venture with Cummins Engine SOLARPLANT 1 has been modified to a solar/diesel combined cycle.

Two 1 mw diesel generator sets have been installed with exhaust heat recovery

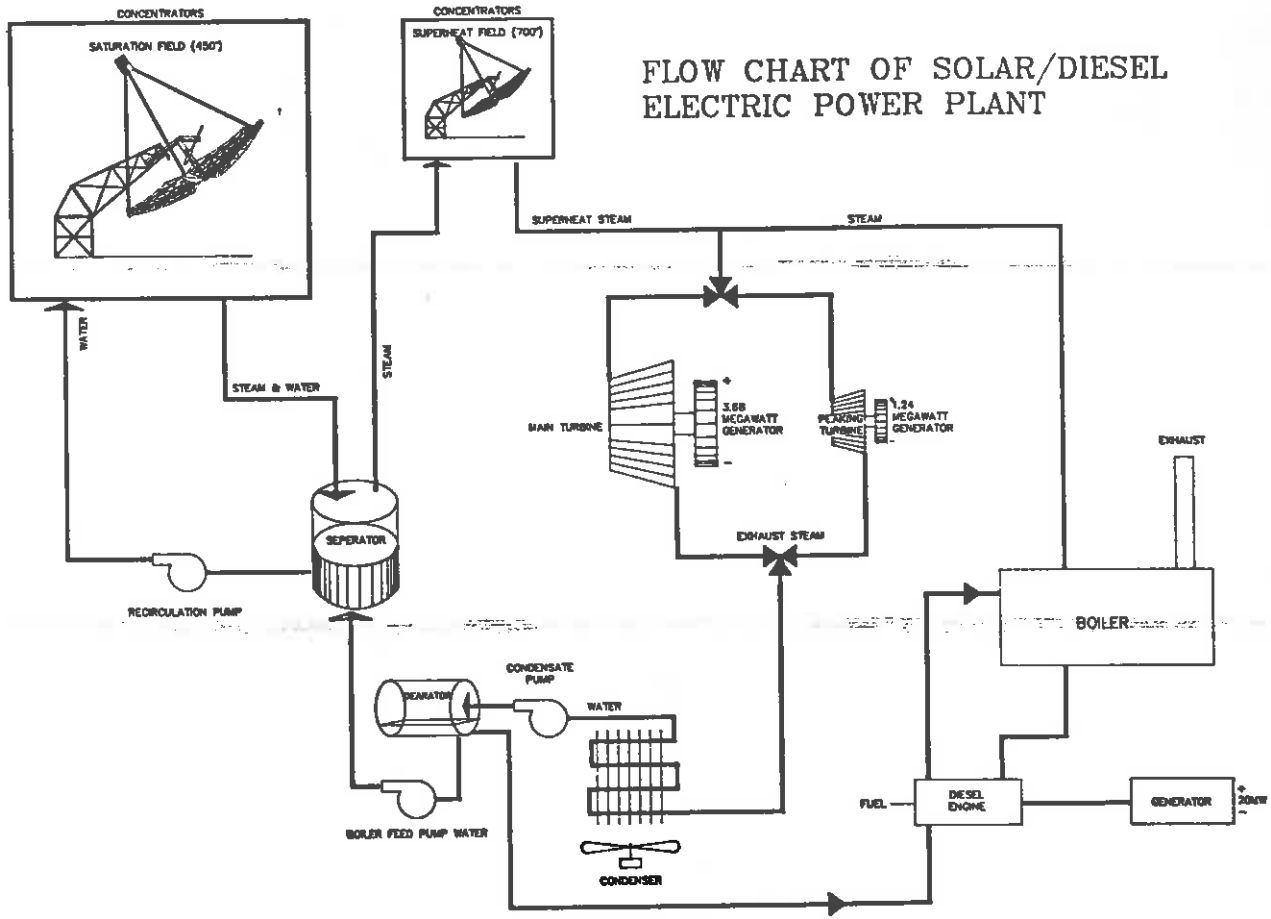
Benefit of combined cycle are:

Recovered heat will keep headers and turbine warm,

Turbines will increase diesel fuel efficiency

Revenue stream continues during solar down-time

FLOW CHART OF SOLAR/DIESEL ELECTRIC POWER PLANT



CONF-870875--Absts.

Distribution
Category UC-62

SAND87-1258
Unlimited Release
Printed August 1987

Proceedings of the Solar Thermal Technology Conference

SAND--87-1258

DE87 014441

August 26 - 28, 1987

Albuquerque, New Mexico

Craig E. Tyner
Editor

Solar Energy Department
Sandia National Laboratories
Albuquerque, New Mexico 87185

ABSTRACT

The Solar Thermal Technology Conference was held on August 26-28, 1987, at the Marriott Hotel, Albuquerque, New Mexico. The meeting was sponsored by the United States Department of Energy and Sandia National Laboratories. Topics covered during the conference included a status summary of the Sandia Solar Thermal Development Project, perspectives on central and distributed receiver technology including energy collection and conversion technologies, systems analyses and applications experiments. The proceedings contain summaries (abstracts and principal visual aids) of the presentations made at the conference.