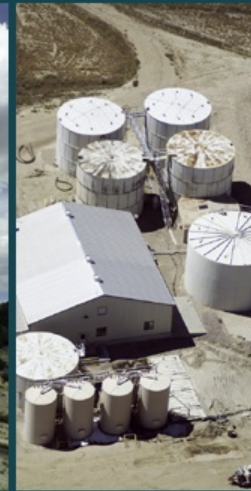


ROCKY MOUNTAIN OILFIELD TESTING CENTER

Testing of ORMAT Technology's Low-Temperature Geothermal Application



Lyle A. Johnson, PE,
RMOTC, U.S. DOE



Project Goals



Validate the use of a binary geothermal power generation system that uses hot produced oilfield water to produce electricity.

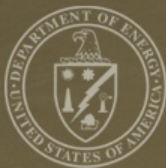
Test the system for a minimum of 1 year

Provide a technical and economic analysis of the process

Testing partner: ORMAT Nevada, Inc.

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Water Treatment Pond



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Projected Generator Performance

Flow Rate:	40,000 bpd (6,358 m ³ /d)
Inlet Temperature:	170°F (77°C)
Outlet Temperature:	152°F (67°C)
Ambient Temperature:	50°F (10°C)
Generator Gross Power:	180 kW
Net Power Output:	132 kW

Unit designed and built by Ormat Systems Ltd, Yavne, Israel.

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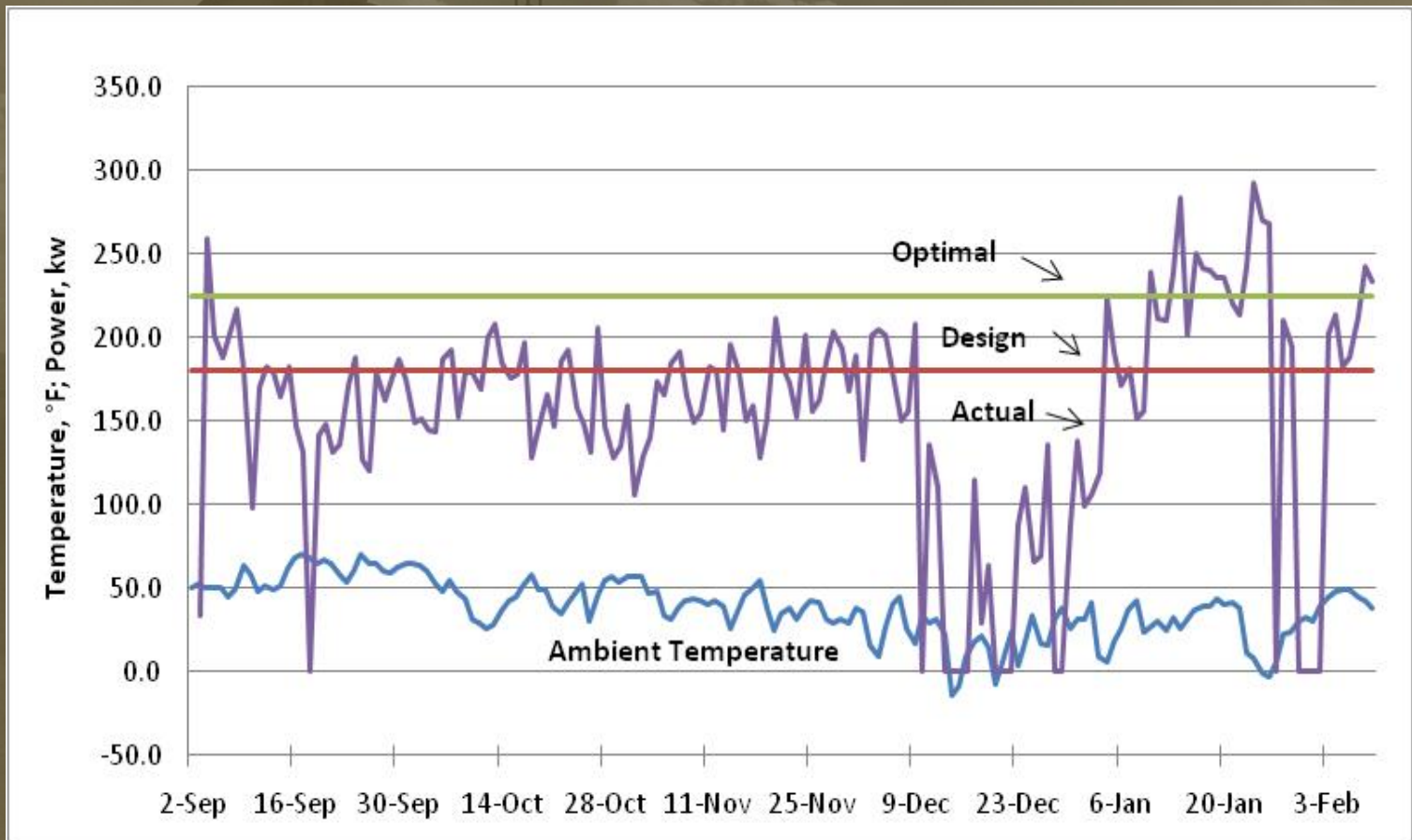


Completed Unit



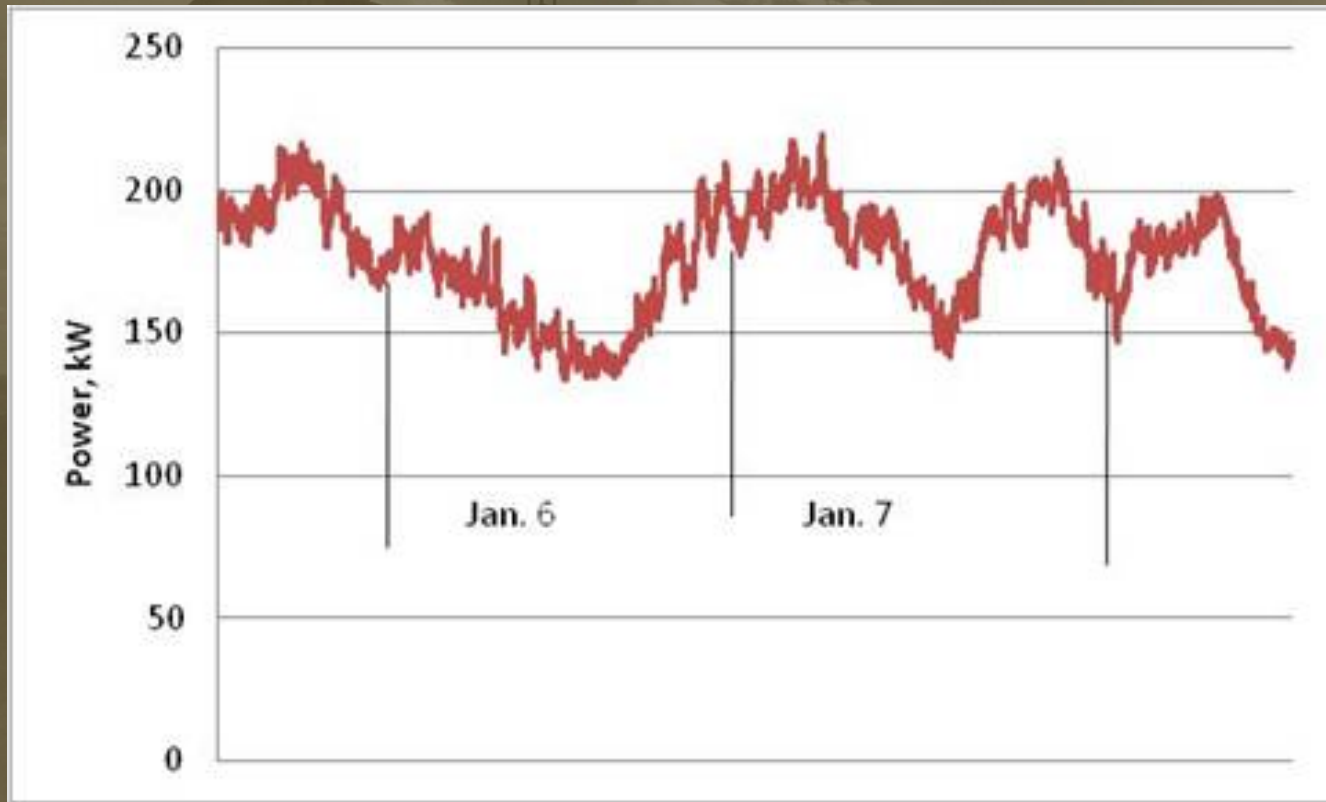
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Initial Operational Trends



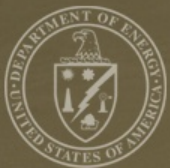
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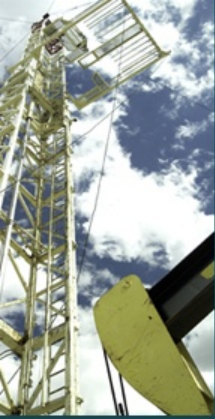
Daily Power Fluctuation



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Past Operational Summary



On Line Total, Total (Actual)	days	161 (151)
Inlet Brine Temperature	°F	195-198
	°C	90-92
Inlet Brine Volume	Barrels	3,047,370
	m ³	484,493
Net Power Produced	kilowatt hour	586,574
Overall		
On line percentage	%	91
Average net power	kilowatt	159
Overall w/o Field Downtime		
On line percentage	%	97
Average net power	kilowatt	171
Avg. Net Power Jan-Feb 2009	kilowatt	200

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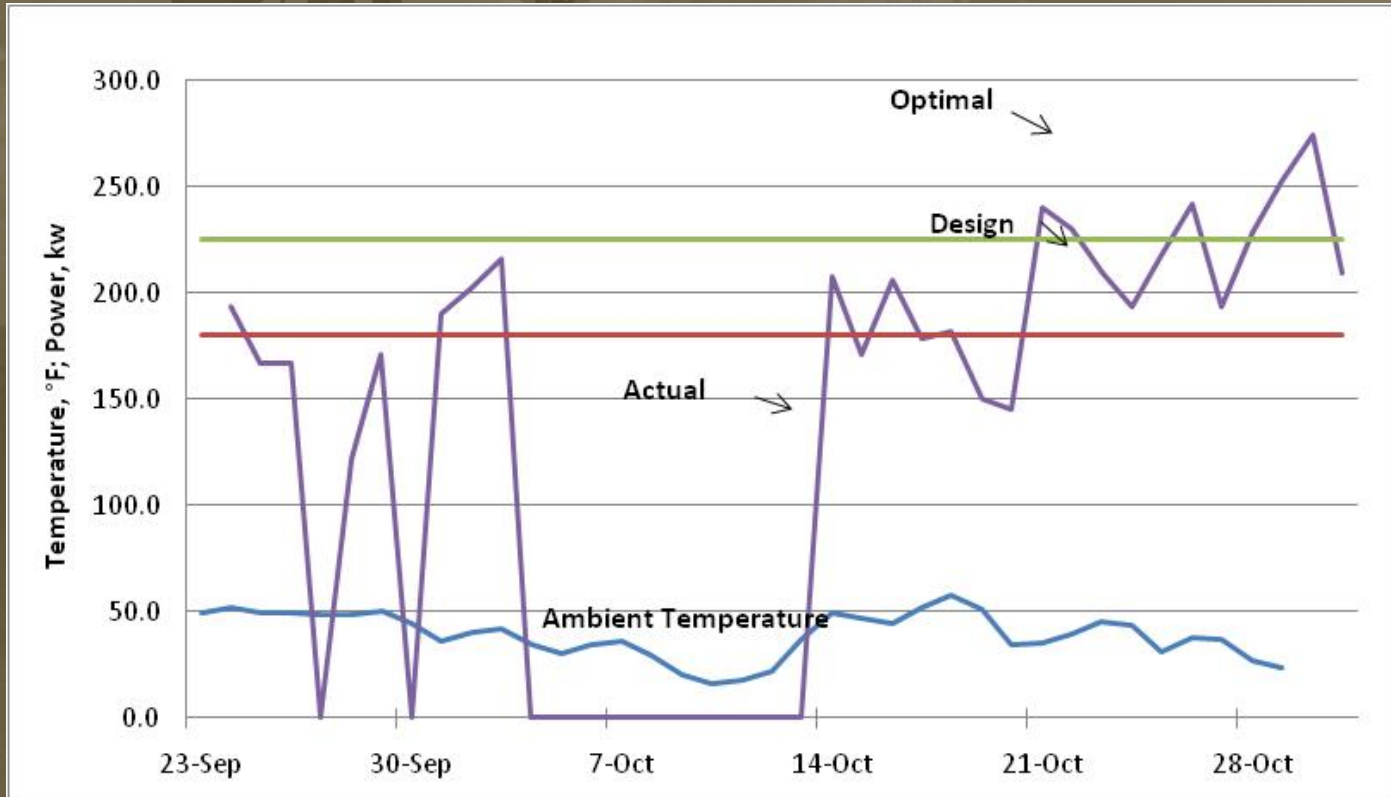
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System Modifications

- Changed system control to a source control loop with an additional control valve
- Installed vapor bypass line around turbine to ease unit starting when hot
- Installed a vibration monitoring system on generator
- Heat traced air lines and all oil lines to prevent line plugging and oil thickening,
- Reduce air cooling capacity in winter
- Upgraded electrical supply and the ESPs in the production wells.

Present Operational Trends



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Present Program



Through a collaborative program with the U.S. DOE's Geothermal Technologies Program, RMOTC's infrastructure is being increased to permit:

- Continue operation of the existing 250kW unit (ORMAT) for a total of 3 years to look at long term operability issues
- Install a water cooled unit (UTC 280) with associated cooling tower and operate for 3 years to look at long term operability issues
- Provide a testing facility for smaller scale prototype power production systems requiring either air or water cooling

Also planning infrastructure to provide EGS testing facilities

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