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Cassia
RaftR
5MW plant

RAFT RIVER 5-MW PILOT PLANT

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Medium temperature (300°F) geothermal resources have the potential for contributing a large amount of electrical energy towards reaching the goal of energy independence. A vast percentage of the available energy from geothermal fluids appears to be in this temperature range. The technology for utilization of this resource is at hand, and with slight advances in the state-of-the-art, this geothermal electrical power generation may become competitive with existing energy sources.

The purpose of the geothermal program at the Idaho National Engineering Laboratory is to establish the methods to utilize these moderate temperature resources. For this purpose, the first Raft River 5-MW Pilot Plant is being constructed, and will be operated and tested.

As a result of power cycle and economic analysis, the Pilot Plant will utilize the binary vapor cycle, with conventional shell and tube heat exchangers where heat is transferred from the geothermal fluid to a secondary or working fluid which is preheated, vaporized, expanded, and condensed in a closed cycle. For improved performance and resource utilization effectiveness the working fluid is vaporized at two different pressures. This is referred to as the dual boiling binary cycle. The secondary or working fluid selected for this plant is isobutane.

Geothermal fluid at 290°F will be pumped through the process plant at a flow rate of 1.04×10^6 lb_m/hr and will be reinjected. The geothermal fluid will vaporize 9.34×10^6 lb_m/hr isobutane at two pressure levels. The isobutane is expanded through a turbine to generate 5-MW(e) electric power.

RAFT RIVER 5 MEGAWATT BINARY POWER CYCLE FACILITY

- 1 TURBINE-GENERATOR
- 2 CONDENSER
- 3 CONDENSATE STORAGE TANK
- 4 HIGH PRESSURE BOILER
- 5 HIGH PRESSURE PREHEATER
- 6 LOW PRESSURE BOILER
- 7 LOW PRESSURE PREHEATER
- 8 ISOBUTANE FEED PUMPS
- 9 GEOTHERMAL FLUID PUMPS
- 10 GEOTHERMAL SUPPLY LINE
- 11 GEOTHERMAL INJECTION LINE
- 12 COOLING TOWER

