1980

THREE POSSIBLE ALTERNATE ENERGY SCHEMES CONSISTENT WITH THE GEOLOGIC ENVIRONMENT OF THE SNAKE RIVER PLAIN

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ABSTRACT

Three possible alternative energy sources using the geologic environment of the Snake River Plain include: geothermal energy, pumped storage and storage of solar or waste heat. Any of the three methods will probably become economically feasible within the next 10 years if the world price of oil continues to rise.

Temperature profile studies indicate potential geothermal resources below the surface of the plain; however, wildcat geothermal wells have had little success in tapping this potential resource, except at the margin of the plain. Based on past geologic and geophysical studies, a prediction can be made concerning faults and other geologic structures that probably exist below the basalt. These structures may provide a geothermal resource if intersected by a well. Gravity, deep resistivity, and magnetotelluric geophysical methods could be used to define these structures and to identify targets for geothermal exploration drilling.

Existing flood-water impounding facilities indicate that surface water can be stored in rather large volumes on the Snake River Plain. Data from water production well tests indicate water can be rapidly extracted from or recharged into the basalt aquifer.

Existing data were scaled up to consider the feasibility of a small, 6 MW pumped storage installation for an existing facility having rather unique power cycle needs. The preliminary study indicated the project would be feasible with storage-utilization cycles ranging from the normal daily pumped storage cycles to 10-week cycles (5 weeks energy storage, 5 weeks energy production).

Large natural caves in the basalt may be sealed and used for storing heat energy. The source may be waste heat from industrial processes or it could come from solar collectors. This application would probably be limited to space heating or other low-temperature energy uses (50 to 100°C). The main purpose for this system would be to average out the peaks and valleys of an

intermittent heat source. This could allow a solar heat system to function through winter storms without using an auxiliary heat source or it could compensate for cyclic heat production from industrial sources.

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PAPER WAS NOT DELIVERED TO SYMPOSIUM COMMITTEE FOR PUBLICATION