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CODY GEOTHERMAL ETHANOL PLANT  
A SITE SPECIFIC DEVELOPMENT ANALYSIS

Rick James

Rocky Mountain Institute of Energy and Environment - University of Wyoming

The methodology utilized in the development of a Site Specific Development Analysis (SSDA), is fairly comprehensive outline of development possibilities and factors. The process works admirably well when used in an optimum situation i.e. when resource data, demographics, economics, process information and other desirable information is available. In the case of this study much of the information was available but significant data is lacking. First, the resource was assumed to be potential by definition at the time of the inception of the planning process in May 1979. This fact is still only an assumption although the geologists optimistic estimates of May 1979 have grown more pessimistic as time progresses. The second portion of data that is lacking is that of the process itself. Little work has been done on developing a process for low temperature geothermal resource applications for ethanol production. Any information that is available is proprietary and cannot be released by this office.

Therefore, much of the plan contains the best estimates available to the GCO staff for development of the analysis. We are a planning organization and are not funded to develop engineering studies of potential applications for geothermal energy utilization.

Data has been gathered to the extent possible, considering the constraints of time and available information, in all areas delineated in the methodology. Each of the areas are essential to a meaningful plan, yet when sections are missing or only available in part, then the usefulness of the SSDA is in jeopardy.

Geothermal fluid boosted by the application of heat pumps and fossil

energy for peak demand seems to be a viable energy combination for the production of ethanol. Through the peaking process electrical energy may be generated to supplement the electrical needs of the plant.

The process is simply that of utilizing the readily available barley as a feedstock and "cooking" it to a moderate temperature. Then the natural fermentation process occurs and ethanol is produced in the mash. The ethanol is then extracted through controlled evaporative method. This controlled evaporation can take several forms, low and high temperature evaporation. Obviously more processing time is required in the low temperature process and perhaps a greater cost. Finally the ethanol is marketed to oil refineries, where it is processed into gasohol at a 10 parts gasoline to 1 part ethanol mixture.

The Big Horn Basin is basically a rural and ranching section of Wyoming. It has a relatively small population when consideration is given to the size of the proposed ethanol plant (20 Mil gals/yr). This would become one of the largest segments of the local economy. Therefore the market area must extend beyond the limits of the basin. A statewide distribution network would be needed for the end product of gasohol, but in this case the end product will be ethanol. The logical market is an oil refinery who is currently refining oil for gasoline. Most oil companies who refine gasoline usually have their own network of outlets throughout the region.

In this case the marketing was an easy task. Husky Oil Company of Cody, Wyoming, currently refining gasoline, has tentatively, through word of mouth, agreed to purchase all of the ethanol which the proposed plant could produce. They would combine it with gasoline and distribute it through their regular channels.

Because of the limited resource data available one can in no way accurately

predict the amount of energy on line as a function of time. However it appears that when comparisons are made with the energy requirements of a coal fired ethanol plant, approximately  $18^6$  BTU/hr would be needed for the plant. The resource temperature is hoped to be approximately 170°F. at a depth of about 1500 feet. Considering this it seems that seven production wells would be needed to supply the plants needs. It is doubtful that the volume at this temperature would be available.