APPENDIX D:
CENTRAL GAS PROCESSING FACILITY

The gas processing facility would be constructed in the NE§ of Sec. 8, T. 26 N., R. 8 W. The EPS Resources Company (EPS) Blackleaf Canyon Gas Treatment Plant will be designed and built to process approximately 10 million cubic feet per day (10 MMCFD) of hydrogen sulfide bearing (sour) natural gas produced from wells in the area. Its purpose would be to remove the hydrogen sulfide and other sulfur bearing compounds and carbon dioxide from the produced gas to render it suitable for sales. It would replace existing wellsite gas production facilities and liquid storage tanks. The plant would require a State of Montana Air Quality Permit prior to its construction.

The EPS plant would consist of two main processes-sweetening towers for removing the hydrogen sulfide from the produced gas and re-injection of the waste acid gas into the same reservoir from which it came. There would be no pollutants emitted into the atmosphere with this "closed system" process. The sweetening of the gas would be done by an amine plant process. In this plant the produced gas stream would come into contact with an organic based solution, the amine solution, in a process tower. The amine solution has an affinity for hydrogen sulfide and carbon dioxide (acid gases) and would act to remove those components from the gas stream. The gas leaving the top of the process tower would be suitable for sales.

The amine solution that leaves the bottom of the process tower is H_2S and CO_2-rich, that is, it has absorbed all of the undesirable (acid) gas from the produced gas stream. The pressure of the solution is then greatly lowered and heated to a higher temperature. This acts to reverse the absorption that took place in the tower and releases the hydrogen sulfide and carbon dioxide from the solution. The amine is now regenerated and ready to be reused in the process contact tower. Refer to Figure D-1 for a schematic of the amine process showing a simplified flow path through this plant.

The acid gas released from the amine during the sweetening process is usually sent to a sour gas flare and burned off. In this plant, the acid gas will be compressed and injected into an existing Madison formation well to be converted to a disposal well (1-16). This will accomplish two things: (1) there will be no pollutants emitted into the atmosphere; and (2) the acid gas will act to re-pressurize the Sun River dolomite section of the Madison Reservoir to maximize hydro-carbon recoveries. A sour gas flare will only be used during upset or problem situations.

Finally, to accomplish water removal, the sales gas stream is then sent through a process known as dehydration. In this part of the plant, the gas will come into contact with a glycol solution in a vertical process contact tower. Glycol is another organic based solution, but one that has a strong affinity for water vapor. In the main process tower, the sales gas stream is stripped of its water vapor and leaves the tower sufficiently dehydrated to be sold.

The glycol solution leaving the bottom of the tower is water-rich; that is, it has absorbed and contains the water vapor from the gas. It is then subjected to a much lower pressure and higher temperature (275 F.) that causes all the entrained water to be boiled away. The water vapor is vented to the atmosphere and the resulting solution is cooled and recirculated back into the main process tower.

To aid in the coordinating of all the plant equipment, a central electronic monitoring and control system will be installed at the plant. Various flows through the plant such as inlet gas, acid gas to the compressor, fuel gas consumed and final sales gas volumes will be constantly monitored on a continual basis. In addition, certain critical pressures and temperatures, as well as process solution chemical concentrations, will also be monitored continously to provide a check on the operation of the plant. This system will provide the plant operators with up-to-date information necessary to keep the plant operating at maximum efficiency and greatly reduce the amount of human visitation to the wellsites.

Figure D-1 Amine Treating Unit.