2.4.2 Turbines and Generators

The power plant would house two horizontal Francis turbines, each rated at approximately 300 cubic feet per second (cfs). The turbines would drive synchronous generators with output ratings of about 6 megawatts (MW) each and speeds of 600 revolutions per minute (rpm). Each generating unit would be equipped with a butterfly inlet valve, manual and automatic controls, and electrical switchgear. Electric power would be generated at 4.16 or 12.47 kV, then stepped up via a transformer, as necessary, to the transmission voltage at the power plant’s adjacent substation.

The proposed capacity of the power plant is based upon the installation of two turbine-generators, identical in size, and rated 6 MW at 300 cfs each. The ratings of these units were selected on the basis of analysis of the site flow and head conditions. Employing the ULS hydrology as the basis, the following considerations governed unit selection and rating:

- Optimal unit selection is based upon consideration of available head and flow, as both determine unit characteristics, and both vary independently. Overall power plant cost is likewise a factor in determining the most economical installation.

- Unit(s) were sized such that 125 cfs (normal site minimum flow) was within the minimum flow range of a single turbine. The number and relative sizing of turbine units was then selected based upon the maximum total flow that can be utilized economically. Multiple equipment manufacturers were consulted in order to predict the best turbine design for the site conditions. The planned capacity is an accurate estimate, with the final value determined by actual equipment supplier bids.

- The largest single unit that can operate with reasonable efficiency and stability at 125 cfs is one whose maximum flow rating is about 300 cfs and whose generator output is about 6 MW.

- Both single- and double-unit plant configurations were analyzed, along with equally and unequally sized units. Considerations of ease of maintenance, spare parts inventory, and operational redundancy favored equally-sized units. Twin 6-MW units were determined to be the most economical development for the anticipated site flow and head conditions. Larger installed capacities would capture higher flows, but the infrequency of such flows resulted in a less economical development.

2.4.3 Transmission Line and Utility Interconnection

The generated electric power would be transmitted to the site of interconnection with the utility’s facilities via an overhead 3-phase power line. The voltage, configuration, and route of the line would vary by interconnection site, which comprise the three action alternatives. The interconnection site establishes the demarcation between project facilities and the utility’s facilities.

The alternative interconnection sites are:

- At a location on county-managed lands south of the project near the county road bridge. This would provide interconnection at 138 kV with Utah Power facilities.