
RFP

**Attachment 1: Technology and
Configurations for Currant Creek 2 for
Engineer-Procure Construct**

Attachment 1

Technology and Configurations for Currant Creek 2 for Engineer-Procure Construct Options for the 2011 All Source Request for Proposal for New Resources

Options for Engineer-Procure-Construct (EPC) of a new resource at PacifiCorp Energy's Currant Creek plant consist of a second combined cycle block at PacifiCorp's Currant Creek Plant. The expected nominal net rating, including duct firing capability, is 620 MW to 665 MW at the site average ambient temperature of 51°F. The rating will depend on the gas turbine manufacturer/model, selected steam turbine, steam condenser size and level of duct firing; it will up to the EPC contractor to select the equipment and overall design configuration subject to design emissions and heat input constraints. The new resource will be fueled exclusively with natural gas. The subject plant will be designed in accordance with the technical specification (Attachment 17); the following is a summary description of the plant location, plant design and equipment options available to EPC bidders.

The Currant Creek Plant is situated on a 240 acre site directly adjacent to PacifiCorp's Mona Substation in Juab County, Utah; it is 75 miles due south of Salt Lake City. The existing plant consists of two General Electric 7241FA combustion turbines equipped with dry-low nitrogen oxide (NOx) combustors, two Vogt Power heat recovery steam generators with duct burners equipped with oxidation catalysts, selective catalytic reduction (SCR) systems, a single Toshiba (26"LSB) steam turbine generator that exhausts into main GEA 30-cell air-cooled condenser, an auxiliary fin-fan process cooler, and associated support equipment. The overall plant is controlled by an Emerson Ovation digital control system.

Currant Creek 2 will use of one of the following advanced natural gas-fired combustion turbines in a combined cycle configuration:

- General Electric 2x1 7FA.05
- Mitsubishi 2x1 501 GAC
- Siemens 2x1 SCGT6-5000F(5)

Currant Creek 2 will have additional power generation capability through the use of duct burners in the heat recovery steam generators to produce supplementary steam for use by the steam turbine generator. The expected additional capability associated with duct firing is 50 to 105 MW, depending on gas turbine type, ambient temperature and configuration. The maximum heat duty input associated for each duct burner in each heat recovery steam generator is:

- General Electric 2x1 7FA.05: 420 MMBtu/Hour (HHV) at 0°F; 440 MMBtu/Hour (HHV) @51°F; 480 MMBtu/Hour (HHV) @100°F
- Mitsubishi 2x1 501 GAC: 51 MMBtu/Hour (HHV) @51°F; 175 MMBtu/Hour (HHV) @100°F

- Siemens 2x1 SCGT6-5000F(5): 200 MMBtu/Hour (HHV) at 0°F; 400 MMBtu/Hour (HHV) @51°F

The gas turbines will be located in their own dedicated weatherproof enclosures. The steam turbine will be located in a fully enclosed steam turbine building equipped with overhead crane. The heat recovery steam generator steam drums will be fully enclosed in heated, ventilated rooms.

The combustion turbines will be equipped with inlet evaporative cooling to increase plant output during periods of high ambient temperatures. The gas turbines will use low-NOx combustors designed to minimize NOx emissions from the combustion process; NOx emissions levels in the gas turbine exhaust will be 9-25 parts per million (by volume) or less, depending on the manufacturer of the gas turbine. Each gas turbine will exhaust into a three-pressure heat recovery steam generator. High, medium and low pressure steam from the heat recovery steam generator will be admitted to the steam turbine generator and exhaust to a main air-cooled condenser. Steam will be condensed in the main air cooled condenser. The plant will be designed for 100% steam turbine bypass. Boiler feed pumps will be located in their own enclosed dedicated, heated and ventilated buildings equipped with overhead monorails for maintenance.

Each heat recovery steam generator will be equipped with an oxidation catalyst to oxidize carbon monoxide and any unburned hydrocarbons in the gas turbine exhaust. Each heat recovery steam generator will also be equipped with a selective catalytic reduction system to further reduce nitrogen oxides emissions in the gas turbine exhaust before it is vented through the stack. The selective catalytic reduction system will use 19% aqueous ammonia. Emissions limits and control will be achieved through the application of best-available-control technology that meet or exceed Utah and federal environmental protection agency requirements. The expected air permit emissions rates in the fired condition across all operating temperatures are as follows:

- General Electric 2x1 7FA.05: NOx: 2 ppmvd 15% O2 with 5 ppm NH3 slip; CO: 2 ppmvd at 15% O2
- Mitsubishi 2x1 501 GAC NOx: 2ppmvd 15% O2 with 5 ppm NH3 slip; CO: 3 ppmvd at 15% O2
- Siemens 2x1 SCGT6-5000F(5): NOx: 2ppmvd 15% O2 with 5 ppm NH3 slip; CO: 2 ppmvd at 15% O2

Gas to the plant is transported via an existing 20" dedicated pipeline (JTL 113) from the Questar Main Line (ML) 104 natural gas transmission line. Questar's ML104 is a high-pressure natural gas transmission line which also connects into the Kern River Gas Transmission system. The pipeline is pressurized in excess of 1,000 psig and is capable of delivering enough gas to serve both the needs of the existing plant and the new addition.

The plant will be designed for "fast start" to minimize startup emissions. An auxiliary boiler will be supplied to provide steam for startup and freeze protection. The auxiliary

boiler will be fired exclusively with natural gas. The plant will be equipped with gas performance heaters. Start-up electric dew point heaters will be provided.

Raw water required for the new block will come from the existing plant's water supply system. 200 acre-feet of consumptive water is available for the second block. A new raw water storage tank will be constructed; a tie will be made to the existing raw water tank. The demineralized water system will be expanded to meet the needs of the heat recovery steam generator and other process needs of Currant Creek 2 and will be intertied with Currant Creek 1. Blowdown from the heat recovery steam generator and other low quality water from other process streams will be recovered and reused. After recovery, process wastewater will be discharged to existing on-site evaporation ponds or other suitable alternative.

The existing fire protection system will be extended and modified. New fire water storage tanks and new fire pumps will be added. The existing potable water system will be extended to provide water to eyewash stations and safety showers. Sanitary wastewater will be discharged into the existing sanitary wastewater drain field. The existing combined administration, control and warehouse building will be used. New air compressors, dryers and air receivers will be installed to serve the new block; a tie to the existing compressed air system will be provided.

Currant Creek 2 will be connected via an extension to the existing 345 kV Currant Creek switchyard which will connect to the existing Mona 345 kV Substation.

The new block will be equipped with a dedicated digital control system, process information data historian, burner management controls, protection systems, and other controls as required. A new emergency diesel generator will be installed to provide necessary backup power in the event of loss of power to ensure a safe shutdown and maintenance of key electrical equipment.

Site upgrades will include new and extended plant roads, site lighting, fencing, security, and communications equipment.