5.0 PROJECT ALTERNATIVES

This section discusses alternatives considered for the Tracy Peaker Project (TPP), including the "no project" alternative, alternative site locations for the facility, equipment configuration alternatives, and alternative transmission routes. Project site alternatives were evaluated according to their ability to meet certain key objectives of the project:

- Locate the site near existing gas, water, and transmission lines to minimize offsite environmental impacts
- Locate in an air basin where GWF Energy LLC has existing emission reduction credits (ERCs). (GWF currently holds ERCs in the San Joaquin Valley Air Pollution Control District.)
- Provide an additional, viable source of peak-load electricity to the California energy market on a fast-track development schedule to meet a July 2002 commercial operation date
- Meet the "minor source" definition under federal air quality regulations to qualify for expedited permitting
- Be capable of being permitted in a time frame that would meet the July 1, 2002, commercial operation date
- Interconnect at a major substation on North Path 15 that has adequate capacity and provides wide access to the electricity market
- Avoid incompatible or nonconforming land uses
- Conform to the provisions of an existing California Department of Water Resources power purchase agreement with GWF

5.1 No Project

Recent electricity shortages in California have caught the attention of the nation. It is evident that California needs a more stable and secure supply of electricity for its burgeoning population and industries. Without it, the economy of California will be adversely affected.

The TPP would provide additional, much-needed electricity for the growing California market. Generation from the TPP would assist in stabilizing the California energy

supply and price structure. The TPP is being developed in response to the governor's executive orders, which call for expedited development and licensing of power plants to alleviate the state's critical electricity shortage.

The "no project" alternative would not allow for a more efficient use of fuel resources for the production of electricity and would only exacerbate the current electrical shortages.

The electrical power demand for California is expected to increase substantially over the life of the project, and new generation sources will be required to meet this demand. In addition, existing nuclear and aging fossil-fuel plants will likely be retired during the same period. Because the TPP would use a natural-gas-fired combustion turbine generator and state-of-the-art emissions control technologies, this project would help replace inefficient technologies with an environmentally superior and more efficient peak-load power plant technology. One of the primary goals of deregulation is to encourage the introduction of new, more efficient, and environmentally superior generators to meet power demand. The "no project" alternative does not further this goal.

5.2 Alternative Site Locations

The main factors in selecting a suitable site include compatible land use, appropriate land area, and proximity to existing utilities, such as transmission lines, natural gas pipelines, and water supplies. The proximity to such infrastructure reduces overall plant capital costs, results in fewer environmental impacts, and provides a more economical project. Sites outside of the San Joaquin Valley were not considered because the ERCs that GWF owns cannot be used effectively in other air basins. Of the major substations located on North Path 15, only the Tesla Substation has adequate transmission interconnection capacity without the need for substantial and costly upgrades.

5.2.1 Proposed Site

The proposed site is an approximately 40-acre parcel located southwest of the Tracy Biomass power plant and the Owens-Brockway glass container manufacturing plant. There are a number of reasons for selecting this site as the preferred location:

- Proximity to transmission interconnect (onsite access), fuel gas lines (onsite access), and service water supply (approximately 1,470 feet)
- Proximity to existing interstate highways and rail transport
- Compatible and conforming land use

The proposed site is located on a parcel that is properly zoned for the intended use, and the intended use is compatible with the current surrounding land uses.

5.2.2 Applicant's Site Selection Process

In addition to the criteria described above, GWF required at least 15 acres for the TPP and preferred not to acquire a site of more than 40 acres. GWF also limited its search to land available from willing sellers.

Using these criteria, GWF screened three sites in the vicinity of the Tesla Substation.

5.2.2.1 Description and Comparison of Sites

Site A. Site A, the site that was eventually selected for the TPP, possessed the following characteristics:

Distance to Transmission	Onsite.
Distance to Natural Gas Interconnection	Onsite.
Distance to Water Supply	1,470 feet.
Transportation	Easy access to rail and freeway (I-205 and I-580).

Land Use Designation and Neighboring uses	Compatible with power plant; Williamson Act contract about to expire (March 2002). Neighboring industrial uses (Tracy Biomass; Owens Brockway glass manufacturing plant).
Permit Processing	The proposed power plant at this site would not be considered a major source under the Federal Clean Air Act. A Prevention of Significant Deterioration (PSD) Permit would not be required; thus, extensive permitting lead time (at least six months) could be avoided.
Size / Constructability	40 acres provides sufficient room for the site and potential for expansion. No major construction issues were identified for the site.
Environmental	No significant site-related environmental impacts were identified.

Site B. This site is immediately north of the proposed site. This site is the location of the existing Tracy Biomass plant.

Distance to Transmission	2 miles.
Distance to Natural Gas Interconnection	1 mile.
Distance to Water Supply	1.5 mile.
Transportation	Easy access to rail and freeway.
Land Use Designation and Neighboring uses	Compatible with power plant (existing biomass plant on site). Zoned Manufacturing-Industrial. Neighboring industrial uses (biomass plant; glass plant).

Permit Processing	Discussions with US EPA staff indicated that the plant would be considered a modification to the existing Tracy Biomass Plant under the Federal Clean Air Act. This would trigger a requirement for a PSD permit from the U.S. EPA. Although securing that permit would present no substantive problems to GWF, discussion with US EPA Region 9 personnel indicated that the PSD permit could not be issued in less than six months from the receipt of a complete application (Haber, 2001). GWF concluded that this time frame presented an unacceptable risk to the schedule for commercial operation of the TPP.
Size / Constructability	15 acres provides adequate size to accommodate the proposed project.
Environmental	No significant site-related impacts were identified. However, more disturbance would result due to the greater length of linears needed at this site location.

Site C. This site is approximately four miles west of the proposed site near Patterson Pass Road and I-580. The site is contiguous with and adjacent to the west side of I-580.

Distance to Transmission	3 miles.
Distance to Natural Gas Interconnection	3 miles.
Distance to Water Supply	2 miles.
Transportation	Easy access to rail and freeway.
Land Use Designation and Neighboring uses	Zoned agricultural. Neighboring uses are industrial and agricultural.
Permit Processing	No PSD requirement.
Size / Constructability	20 acres provides adequate size to accommodate the proposed project.

Environmental	Potential visual impact to I-580 from cooling tower plumes if proposed project is converted to combined cycle plants, More disturbance would result due to the greater length of the natural gas and water linears.

5.2.2.2 Williamson Act Considerations

Sites B and C possess general plan and zoning designations that allow industrial use and do not encompass any acreage encumbered by a Williamson Act contract requiring a continued use that is compatible with agriculture. Site A is similarly compatible with industrial use; however, it is encumbered by a Williamson Act contract.

In March 1992, the property owner of Site A gave proper notice to San Joaquin County that the contract would not be renewed. Consequently, the contract will expire as a matter of law in March 2002, prior to commercial operation of the TPP, with an overlap of three months with the construction schedule.

Given the expiration of the Williamson Act contract and the potential compatibility of the electric generation facilities with the continued viability of agriculture in California (see Section 8.4, Land Use, and Section 8.9, Agriculture and Soils). GWF concluded that the use of Site A did not present a significant impact on agricultural resources. Thus, the use of Sites B or C, though these sites were not encumbered Williamson Act contracts, did not present an opportunity to lessen potentially significant impacts.

Site A was selected as the site that best fulfilled project objectives and presented no significant site-related environmental impacts.

5.3 Alternative Project Configurations

The selection of the project configuration for the TPP was based on consideration of the following factors:

- Commercially available turbine types

- Number of required units available on a fast-track delivery schedule to meet the desired electrical output for a July 2002 commercial operation date
- Performance and emission characteristics of the available turbines
- Project economics
- Ability of the emissions control equipment to meet the air quality regulations and qualify as a minor source

The proposed project configuration would generate a nominal 84.4 megawatts (MW) of electrical output for each combustion turbine generator (CTG) for sale under annual average conditions. The project would consist of two General Electric (GE) Frame 7EA gas turbines with a total generation capacity of 169 MW. The CTGs are commercially available technologies that have been widely used in simple-cycle applications.

5.3.1 Combustion Turbine Generator

The basic project configuration was selected based on technical and economical evaluations of cycles capable of meeting the electrical output requirements and complying with air permit limitations and other regulatory requirements. Initial screening studies evaluated various commercially available CTG sizes and technologies. The screening studies considered the CTGs offered by major manufacturers. After reviewing studies to determine power demands in the near future and emission requirements, GWF selected a two-unit configuration to achieve better economies of scale. Final selection of the CTG was based on the results of a competitive bid process for turbine availability to meet the required July 2002 commercial operation date. The CTG model selected was a GE PG7121 (EA). This model is a heavy-duty, industrial class E machine, with a 17-stage axial flow compressor, a three-stage turbine, and 10 cannular-type fuel combustors. The compressor provides a 12.6:1 compression ratio, and the unit requires 315 psig (pounds per square inch gauge) minimum fuel gas pressure. The base load turbine inlet temperature is 2,020 degrees Fahrenheit. The inlet guide vanes are modulating type. The starting package is a motor-start-type system. The generator is air cooled.

5.3.2 Alternative Fuels

Natural gas is the preferred fuel for the TPP. A major Pacific Gas and Electric Company (PG&E) natural gas supply pipeline crosses the project site, eliminating the need for an additional pipeline. Natural gas is considered the most cost-effective and reliable fuel, and natural gas combustion results in lower air emissions than other fuel alternatives.

Possible alternative fuels for the project include distillate oil, crude oil, produced gas, petroleum coke, coal, and biomass. These alternate fuels are less favorable because they would produce greater air quality impacts than the preferred fuel. Also, both distillate oil and crude oil would require truck transportation or the construction of a new pipeline. For these reasons, natural gas was selected as the sole fuel for the TPP.

5.3.3 Alternative Cycles

Due to time constraints and the immediate demand for power in California, the simple-cycle design was the only viable option. Conversion to a combined-cycle power plant is possible to satisfy any future increase in the demand for power.

In addition to the simple-cycle turbine, several advanced turbine cycles are also available, including the Kalina cycle, the chemically recuperated gas turbine (CRGT), the humid air turbine (HAT), the inter-cooled steam-recuperated gas turbine (ISRGT), and the steam-injected gas turbine (STIG). With the exception of the STIG cycle, all of these technologies are still in the development stage and are not considered commercial. STIG technology has had mixed commercial success and does not offer the proven longevity and efficiency of currently available advanced turbine technology.

5.3.4 Alternative Water Sources and Technologies

Simple-cycle design does not produce or utilize steam, which eliminates the need for water and for wet and dry condensers, cooling towers, pumps, piping, etc. Water consumption would be limited to the water used in the evaporative cooler and in the water wash system for the CTG. Air-cooling of the water for the CTG cooling module heat exchanger

would eliminate water loss due to evaporation. Other uses of water at the TPP would be minimal, as described in Section 2.2.7 and in Figures 8.14-1a and 8.14-1b.

Canal water was found to be the most suitable water source for this site because of its proximity and because it eliminates the need for a pipeline external to the site. The canal water quality is satisfactory for the evaporative cooler, so no major water equipment is necessary.

Groundwater levels in the area of the TPP are considered to be in an overdraft condition. As a result, GWF did not pursue the creation of an additional demand on this already impacted resource. Recycled industrial wastewater in the area was either unavailable, too distant from the TPP site, or would require substantial pretreatment and the generation of extra volumes of wastewater in order to be usable. No economically viable source of industrial wastewater was identified in the project area.

5.3.5 Alternative Site Access

General access to the TPP is afforded by Interstates 580, 205, and 5 and by a Union (Southern) Pacific Railroad track, as described in Section 2.2.1. The proposed TPP is located in a well-developed industrial area with an established transportation system. Access to the proposed site would be limited to existing roadways. Local access is through W. Schulte Road on the north. There are no practical access alternatives.

The preferred site access road is approximately 0.6 miles long. This road would be an improved, asphalt-paved road running from W. Schulte Road southward to the site. This road would run west of the Tracy Biomass plant and the Owens-Brockway glass container manufacturing plant.

An alternate site access road was considered. This road would run approximately one mile in length, from Lammers Road and would be located south of the Union (Southern) Pacific Railroad corridor. The principal advantage of this access route is the avoidance of the rail crossing. However, the approach to the site from this direction is longer and would be more expensive. In addition, the Union (Southern) rail corridor is infrequently used, and initial

discussions with the company indicated that an easement for the preferred site access road is possible.

5.3.6 Preferred Project Configuration

The preferred configuration for the TPP consists of two gas-fired GE Frame 7EA CTGs, each equipped with dry low nitrogen oxide (NO_x) combustors, and one aqueous-ammonia-type selective catalytic reduction (SCR) and carbon dioxide oxidation catalyst. The preferred configuration was selected for the following reasons:

- The CTG is a commercially available unit that would efficiently meet the desired electrical output.
- The emissions control devices would meet all applicable air quality regulations and achieve minor source status under federal air quality regulations.
- The chosen configuration is the most economically viable alternative and satisfies the need for power in the shortest time possible.

5.4 Alternative Transmission Routes and Interconnections

5.4.1 Proposed Transmission Route and Interconnection

The selection of the transmission line route and substation location included consideration of these factors:

- Potential environmental impacts of the transmission line between the TPP site and the point of interconnection
- The ability to acquire control of substation site land and obtain the parallel existing PG&E rights-of-way required for the line
- Potential engineering constraints

The magnitude of transmission line impacts is directly related to the length and width of the right-of-way, the height of the structures, and the length and location of the transmission line route. Most potential environmental impacts resulting from transmission line development occur during construction, when support structures are put in place, access trails

and staging areas are developed, and rights-of-way are cleared. These potential impacts can include fugitive dust and vehicle/equipment exhaust emissions from construction activities; wildlife disturbance because of noise and human activity; removal and, in some cases, replacement of native vegetation; disturbance of historic or archaeological features; and erosion from stormwater runoff. Potential impacts during operation may include bird mortality from electrocution and collisions with power lines and visual impacts of the transmission line facilities. The potential effects of long-term exposure to electromagnetic fields, particularly on human health, may also need to be considered.

The proposed transmission interconnection would loop PG&E's Tesla-Kasson 115-kilovolt (kV) line (which crosses the 40-acre parcel owned by GWF Energy LLC) into the TPP. This interconnection with the PG&E system would require two short 115-kV line segments, two 115-kV circuit breakers, and a 115-kV bypass switch. See Section 6.0 (Electric Transmission) for a discussion and Figure 6-1 for a depiction of the proposed TPP transmission line.

5.4.2 Alternative Transmission Route and Interconnection

An alternate transmission line would be an approximately five-mile-long, single-circuit, 230-kV line. From the plant, the first 2.8 miles would be a new transmission line that would travel southwest, paralleling the existing 115-kV Tesla-Manteca line to the intersection with the Tesla-Wesley 230-kV line. The Tesla-Wesley 230-kV transmission line is a jumpered double-circuit transmission line. PG&E would propose to break the double circuit at the intersection of the Tesla-Manteca and Tesla Wesley lines. The alternate line would turn northwest for approximately 2.1 miles, until it enters Tesla Substation at Breaker 252. This segment of the alternate line would use the existing conductors on one of the two separated circuits on the existing transmission towers of the Tesla-Wesley 230-kV line. To accommodate the existing power flow, the second circuit of the unjumpered Tesla-Wesley line would be reconductored with 954-kilo circular mills (kcmil) steel-supported aluminum conductor. To accommodate the alternate line at Breaker 252, the Tesla-Newark #2 Line (now terminating at Breaker 252) would need to be relocated by the TPP to a new breaker position within the Tesla Substation. This new breaker position is being constructed by PG&E as part of the previously

planned Bank 6 Upgrade Project. All Tesla Substation upgrades would occur within the substation fence line. The first two miles or so of the alternate line would be tower and line construction, whereas the last two miles or so would be reconductoring only.

5.5 References

Pacific Gas and Electric Company (PG&E), 2000. *System Impact/Facility Study: GWF Energy LLC, Tracy Peaking Power Project.*