Chapter 3—Alternatives to the Proposed Project

3.1 Introduction

This chapter describes the decision analysis process PG&E used to determine the preferred project, provides a description of each alternative and its ability to meet the area's electric need, and includes a discussion of the potential environmental impacts of each alternative. The environmental impacts for these alternatives have been described qualitatively.

PG&E evaluated a number of alternative methods for achieving the goal of relieving the electrical system deficiency that is forecasted to occur in the Tri-Valley area by the year 2002. The alternatives considered were:

No Project—Transmission and distribution facilities would not be constructed under the No Project Alternative (see Section 3.4).

Alternative 1—This alternative has the same routing and substation improvements as the proposed project but includes adding conductor to existing towers in the Tesla-Newark corridor, resulting in a different electric service alternative (see Section 3.5).

- North Area

  Build new Dublin and North Livermore Substations and a double-circuit overhead 230 kV transmission line to connect the substations to the Contra Costa-Newark transmission line.

  Build a new double-circuit 230 kV transmission line from Tesla Substation to the Contra Costa-Newark transmission line.

- South Area

  Connect the Vineyard Substation with two independent radial circuits with one connecting to a new circuit in the Tesla-Newark corridor and the other to the Contra Costa-Newark #2 Circuit. The two new radial circuits will be overhead/underground 230 kV circuits along the same route as the proposed project.

  Add conductor to the vacant towers on the Tiger Creek-Newark corridor from the tap point to a location near the Lawrence Livermore National Laboratory (LLNL) Substation.

Alternative 2—This alternative differs from the proposed project because the Vineyard Substation would be supplied from the north with a looped double-circuit transmission line (see Section 3.6).

- North Area

  Build new Dublin and North Livermore Substations and a double-circuit overhead 230 kV transmission line to connect the substations to the Contra Costa-Newark transmission line.

- South Area

  Build a new single-circuit 230 kV transmission line between Dublin Substation and San Ramon Substation.

  Loop the existing Vineyard Substation and the San Ramon Substation to the new Dublin Substation with a double-circuit overhead/underground 230 kV transmission line from the Dublin Substation to the Vineyard Substation via Fallon Road and El Chorro Road.

  Reconductor approximately 31 miles of the Pittsburg-San Ramon 230 kV transmission line with steel supported aluminum conductor.

Alternative 3—This alternative differs from the proposed project because the Vineyard Substation will be supplied from the north with a single-circuit 230 kV transmission line and from the south with a single-circuit 230 kV line (see Section 3.7).

- North Area

  Build new Dublin and North Livermore Substations and a double-circuit overhead 230 kV transmission line to connect the substations to the Contra Costa-Newark transmission line.

- South Area

  Rebuild the Iron Horse Trail overhead 60 kV line to a single-circuit 230 kV line from San Ramon Substation to the Vineyard Substation.

  Rebuild the Vineyard Avenue 60 kV line to a single-circuit 230 kV line from the Vineyard Substation to the Tiger Creek-Newark line in the south corridor.

  Add conductor to the vacant towers on the Tiger Creek-Newark corridor from the tap point to a location near the LLNL Substation.

Alternative 4—This alternative differs from the proposed project because no transmission facilities would be built in the south; instead, contracting for a variety of distributed resources options would be evaluated and implemented (see Section 3.8).

- North Area

  Build new Dublin and North Livermore Substations and a double-circuit overhead 230 kV transmission line to connect the substations to the Contra Costa-Newark transmission line.

- South Area

  Add distributed resources to the Vineyard area.

PG&E evaluated each alternative for its ability to meet the identified electric needs in the area and analyzed its potential effect on the existing electric transmission system. The analysis determined that Alternatives 1, 2, and 3 are feasible and are capable of being implemented within the timeframe dictated by the area's electric needs. Alternative 4 could defer the need for part of the project as discussed in Section 3.8. The alternatives differ according to environmental impacts, engineering feasibility, and cost.

3.2 Decision Analysis Process

3.2.1 Initial Routing and Siting Study

After determining general areas where transmission and distribution facilities were needed to increase electric capacity in the Tri-Valley area, PG&E developed numerous potential alignments for new 230 kV transmission lines and at least three different sites for each distribution substation. PG&E considers several important factors when siting electric facilities. These factors typically include the following:

- Ability to use existing right-of-way easements
- Ability to follow established utility corridors
- Ability to use existing transmission line structures where practicable
- Accessibility to construct and maintain supporting structures
- Length of new lines and number of new towers or poles
- Number of crossings of highways, creeks, and other electric lines
- Minimization of exposure to geologic hazards
- Ability to avoid relocation of existing businesses or residences
- Ability to determine proposed land uses through owner consultation
- Ability to avoid displacement of mature trees
- Compatibility with local planning agencies' vision and/or planning strategy for development in the project area
- Easement acquisition costs
- Installation and maintenance costs
- Ability to minimize impacts to proposed development plans

As described in Chapter 2, Project Description, two new distribution substations are needed in the northern area of the valley, and additional reinforcement must also be provided to the Vineyard Substation to meet the electric power needs of the local community. Potential locations for new facilities were identified through fieldwork, review of aerial photographs, and information obtained from developers, property owners, and representatives of local jurisdictions. PG&E identified several general corridors for transmission line facilities based on the need to string electric wires from one specific point to another. Within these

corridors, numerous routes consisting of separately named segments were also identified. All of the transmission line routes and original substation sites considered in the siting study are shown in Figure 3-1.

By conducting an environmental, engineering, and cost evaluation of each segment, and by performing a structured decision analysis process (described in Section 3.2.2), PG&E determined the best routes for the transmission lines. For example, a transmission line connecting the Vineyard Substation to the Tesla-Newark corridor can be routed 14 different ways along the various segments shown in Figure 3-1. All possible routing options along the various segments were compared against each other. PG&E also compared identical routes at different transmission line voltages of 60, 115, and 230 kV, in addition to evaluating whether the line would be single- or double-circuit. The preferred and alternative transmission line routes and substation sites were determined by rejecting some segments/sites in favor of others for environmental, engineering, and/or cost reasons.

The technical staff responsible for the PEA impact analysis chapters analyzed each segment and substation site against a variety of environmental criteria (primarily based on CEQA significance criteria as listed in the technical chapters of this PEA). PG&E engineers and construction managers experienced in design and construction of transmission towers and substations conducted the engineering feasibility evaluation. PG&E engineers, property assessors, as well as transmission and distribution planners provided the cost estimates for each route segment and substation site. The criteria used in the siting study are listed in Table 3-1.

The technical specialists provided the results of their evaluations in numerical values by segment/site. Criteria were expressed numerically to facilitate comparison of the data by the decision analysis software model Criterium DecisionPlus (see Section 3.2.2). For example, a higher number of wetlands along a segment indicated a greater potential for impacts to wetlands. Narrative criteria, such as a rating of poor to excellent, were converted into numerical equivalents for input into the model. For example, poor habitat quality for special status plant species was assigned a value of 1 and excellent habitat quality was assigned a 5. Therefore, a high score indicated the presence of high quality habitat that could potentially be impacted if a transmission tower were to be placed in the area. Ratings included scales of one through three or one through five, depending on the criteria.

3.2.2 Criterium DecisionPlus Software Program

The Criterium DecisionPlus software program was used to help evaluate the best transmission line routes and substation sites using data obtained for each segment. The software program is a windows-based decision management tool that allows comparison of complex sets of data using a simple multi-attribute rating technique. It tabulates and ranks the results based on how well alternatives meet the criteria established for the model. It requires data to be organized in a hierarchy of primary criteria and subcriteria, and that the criteria be “weighted” according to importance. The program “normalizes” the scores by multiplying the assigned weights for each criterion by the data scores.

Insert Figure 3-1. Transmission Line Routes and Substation Sites Considered in the Siting Study

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TABLE 3-1

Decision Analysis Criteria

Primary Criteria	Subcriteria	Measureable Unit
Engineering	Construction clearance difficulty	Low to high
	Feeder length to substations	Linear feet
	Required road access to segment	Miles
	Number of roadway, railroad, and other crossings	Number of crossings
	Ability to meet project schedule	Poor to good
	Ability to meet load growth	Poor to good
Economic	Land cost	Dollars
	Distribution circuit segment cost	Dollars
	Substation cost	Dollars
Environmental		
Transportation	Duration of major roadway closures	Number of minutes
	Conflicts with proposed transportation projects	Number of conflicts
	Conflicts with flight paths	Linear feet
Cultural Resources	Spatial conflict with known/recorded cultural resource site	Number of conflicts
	Potential spatial conflict with known/recorded cultural resource site	Number of conflicts
	Archaeological “high probability area”	Number of areas
Biological Resources	Riparian habitat crossing	Linear feet
	Wetland habitat crossing	Linear feet
	Habitat quality for special status plant species	Poor to excellent
	Habitat quality for special status terrestrial species	Poor to excellent
	Habitat quality for special status aquatic species	Poor to excellent
Noise	Noise level increase	dBA (decibel level)
Land Use, Recreation, and Agricultural Resources	Prime farmland conversion	Number of acres
	Conflicts with land use plans and policies	Number of acres
	Conflicts with existing uses	Number of acres
	Recreational areas closed	Number of acres
Population and Housing	Houses or business buildings displaced	Number of buildings
Geology	Fault rupture hazard potential	Low to high
	Liquefaction hazard potential	Low to high
	Landslide hazard potential	Low to high
Visual Resources	Visual impact sensitivity	Low to high
Water Quality and Hydrology	Water bodies crossed	Number of crossings
	Known contaminated sites crossed	Number of sites
	Probability of impact from 100-yr flood zone	Low to high
	Probability of impact from dam failure flood	Low to high

Criteria were included in the model only if comparison of the criteria to different segments or routes would produce different results. For example, air quality criteria were not included in the model because these impacts are temporary during construction and there would be little difference in air quality impacts from one segment or route to another.

At subcriteria levels (wetland habitat, special status species, etc.), varying weights were assigned based on the relative importance of the criteria to the project. For example, potential impacts to wetlands were considered more important, and therefore given more weight, than potential impacts to riparian habitat crossing. Environmental criteria such as visual resources, biological resources, and land use were also given differing weights. For example, land use impacts were given more weight than noise impacts. The absence of sensitive noise receptors along most of the segments lessened the importance of noise impacts for the entire project. Visual and aesthetic impacts were given more weight than potential water quality impacts, primarily because water quality impacts can typically be completely avoided or mitigated.

PG&E used the model to compare a total of 244 alternatives based on the 34 engineering, economic, and environmental criteria listed in Table 3-1. The alternatives were defined based on overhead or underground routing, transmission line voltage (60, 115, or 230 kV), and routing location. A total of 18 different models were produced to determine the preferred transmission line routes and substation sites. The results of the decision analysis process allowed PG&E to develop several alternatives that would meet the need for the project. Engineering, economic, and environmental criteria were given the same weight in the decision analysis model so that all of these factors could be considered equally in making the decision on the preferred alternative. For almost every model, when all weight was placed on environmental criteria and none was placed on economic or engineering criteria, the preferred route or alternative did not differ from the one determined to be the best using equal weighting. In the instances where a different alternative was preferred with all weight on environmental factors, the result varied by only a few points and the difference was small enough to be insignificant.

3.3 Development of Alternatives and Selection of the Preferred Project

3.3.1 North Area—Phase 1

Substation Sites and Transmission Line

PG&E identified seven 5-acre parcels in two areas where existing and new load growth necessitates development of two distribution substations. Four different sites were considered for development of the Dublin Substation and three were considered for the North Livermore Substation. While a substation could be constructed on any of the available sites, each one has particular advantages and disadvantages as summarized in Table 3-2. A transmission line connecting each substation to a source of power is required, and the closest source in the area is the Contra Costa–Newark 230 kV line, located east of the North Livermore area.

PG&E determined that use of its existing 230 kV easement for the North Area transmission line would have significantly fewer environmental, engineering, and cost impacts than developing a new corridor for the transmission line.

The existing vacant easement was purchased in the early 1960s for an intertie project. At that time, basic design engineering was completed. The acquisition of an easement, including the preparation, negotiation, payment, and recordation of easements was also completed. This represents a considerable economic investment that would have to be repeated at today's costs should another alignment be selected. In addition, the former and present property owners have anticipated the future construction of the tower line and have designed any improvements or development to their properties accordingly.

Interstate 580 is the largest source of potential viewers of the proposed transmission line. The intermediate range of hills and canyons offers significant screening of the area. The location of the easement at the northern end of the Las Positas (North Livermore) Valley places the corridor at least one mile north of the proposed North Livermore Specific Plan boundary. Placing a new transmission line south of the existing vacant easement could affect views from this proposed development and create land use conflicts.

The Livermore Monitoring Station operated by the Federal Communications Commission (FCC) is located between Hartford Avenue and May School Road, south of PG&E's existing easement. This area includes an antennae array that is sensitive to above ground structures. Based on FCC recommendations, towers of the type proposed for this project are not an interference as long as they are one mile distant. This further restricts line placement south of the existing easement.

In the North Livermore valley, PG&E's existing easement is located along east-west property division lines. Parallel easement locations north or south of the current location would sever the properties. There are no east-west property line divisions within a reasonable distance by which to route a new line. Placement of a new transmission line north of the vacant easement would also require additional extension of lines to connect to the substation locations.

Therefore, in the area from the Contra Costa–Newark line to the substations, alternative routes were not developed for the decision analysis process. However, for the Phase 2 route, several different alignments were considered and are described in section 3.3.2.

The impact assessment for substations also includes the portion of transmission line that would be required to provide power to the substation. For example, for North Livermore Substation Site #1, the substation would be located directly under the new North Area transmission line and no additional line would be needed to provide power to the substation. For North Livermore Substation Site #2, a transmission line would need to be built from the North Area line down North Livermore Road to the substation site.

TABLE 3-2
Comparison of Substation Sites and Associated Transmission Line Feeders

	Summary of Potential Environmental Impacts	Engineering Feasibility[1]	Total Cost[2] (in millions)
Dublin Substation Site #1	Potentially significant visual impacts on views from Tassajara Road and rural residences.	Requires 31.5 miles of distribution circuits from the substation, 0.44 miles of new access road, crossing of one water body and one road, and has moderate construction clearance issues.	$22.7
Dublin Substation Site #2 (preferred)	Loss of 5 acres of Williamson Act land. No significant visual impacts with implementation of mitigation measures.	Requires 36 miles of distribution circuits from the substation, 0.88 miles of new access road, crossing of one water body, and has minimal construction clearance issues.	$23.8
Dublin Substation Site #3	Conflicts with planned residential development. Potential visual impacts from one residence and from planned residences.	Requires 27.5 miles of distribution circuits from the substation, 1.5 miles of new access road, crossing of 4 water bodies, and has moderate construction clearance issues.	$22.6
Dublin Substation Site #4	Conflicts with planned residential and transportation plans. Potential visual impacts from planned residences.	Requires 21.3 miles of distribution circuits from the substation, 1.2 miles of new access road, crossing of 4 water bodies, and has more significant construction clearance issues than other sites.	$21.3
North Livermore Substation Site #1	Potential significant visual impact from a scenic roadway.	Requires 23.3 miles of distribution circuits from the substation and has minimal constriction clearance issues.	$15.4
North Livermore Substation Site #2 (preferred)	Potential conflicts with future residential and greenbelt land uses. No significant visual impacts with implementation of mitigation measures.	Requires 16.6 miles of distribution circuits from the substation and has moderate construction clearance issues.	$13.9
North Livermore Substation Site #3	Potential conflicts with existing regional park and transportation plans. No significant visual impacts with implementation of mitigation measures.	Requires 13.3 miles of distribution circuits from the substation, crossing 2 roads, and has more significant construction clearance than other sites.	$14.4

[1] Includes requirements for construction clearances, access roads, and the number of crossings of linear features, e.g., roads, railroads, aqueducts.

[2] Includes cost of connecting transmission lines, substation construction, land costs, and civil engineering and construction costs.

3.3.2 North Area—Phase 2

As shown in Figure 3-1, several routes were considered for the 230 kV transmission line from the Tesla Substation west to the Contra Costa-Newark transmission line. Route "C" was determined to be the preferred route. The geographical area available to site transmission lines between the Tesla Substation and the proposed 230 kV connection for Phase 1 at the Contra Costa-Newark 230 kV line is limited to approximately three pathways. In the Altamont Range area, the opportunities diminish due to terrain, land use, and an existing Western Area Power Administration (WAPA) transmission line. These routing constraints limit the reasonable corridor width traversing the westerly end of the Altamont range to approximately two miles.

The southern boundary of Brushy Peak Regional Park, located approximately 2.5 miles north of Interstate 580 and east of Vasco Road, effectively limits routing a transmission line corridor north of this boundary. Brushy Peak consists of approximately 1,200 acres of open space under the stewardship of the East Bay Regional Park District (EBRPD). The EBRPD and CPUC guidelines do not support the placement of new electric transmission lines within a designated park preserve. The southern portion of the Brushy Peak preserve was recently acquired by EBRPD with the knowledge that PG&E owns a transmission easement through the property. The EBRPD indicated a willingness to help determine the least environmentally sensitive location for a transmission line in this location.

Browning Ferris Industries (BFI) owns and operates a landfill east of Vasco Road and southwest of the EBRPD Brushy Peak Preserve. This further narrows the routing opportunities because the landfill is wider than can be reasonably spanned by the transmission line. Due to the limited compaction of subsurface material and the nature of the landfill basin liner, it is not desirable to place transmission tower footings within the capped area of the facility. BFI recognizes that PG&E's vacant transmission easement traverses the landfill and has offered to accept a relocation to the west and south boundary of their property to avoid any issues regarding construction within the landfill.

There is an established flight path between Livermore Municipal Airport and the San Joaquin Valley. An existing WAPA transmission line provides 230 kV service to the LLNL via a route that crosses the Altamont Hills from its source at Tracy Substation. This line is perpendicular to the flight path and has associated safety considerations; a fatal aircraft accident has resulted from contact with this line. The electric system grid requirements would necessitate that the proposed PG&E transmission line cross over the 1,260-foot-high WAPA line. An even higher electric line crossing on the eastern approach to the Altamont Pass cannot be recommended due to the flight path. If the line were sited north of the Interstate 580 entrance into the Altamont Pass from the east and crossed the WAPA line at a location where the terrain allows for a lower aerial crossing position (approximately 1,000-foot elevation and parallel to the predominant flight path), the safety issue would be mitigated.

Existing and proposed residential and commercial development north of Interstate 580 and east of Vasco Road also limits the transmission line corridor to a position approximately 2 miles north of Interstate 580 in the Vasco Road vicinity. Otherwise, residences and commercial development would need to be relocated to provide a suitable line location.

Route "E," shown in Figure 3-1, is approximately 10.8 miles long and takes advantage of an established parallel road network and established railroad corridor. The major disadvantage of this alignment is the circuitous route that would be required to parallel the railroad, resulting in increased length and cost. Route "B" would be approximately 10.4 miles long and has land use constraints due to the landfill and Brushy Peak Regional Preserve.

The preferred route, Route "C," is approximately 9.5 miles long and offers the advantages of an established electrical transmission easement. For the most part, windfarm operators have sited their wind machines with spacing that allows for future construction of transmission towers. The windfarms also provide a well established all-weather road system, negating the need for the construction of new roads. The preferred route would also cross the WAPA 230 kV transmission line at a location that takes advantage of a low point in the wire sag. This allows the proposed PG&E line crossing to be constructed as low as possible within the flight path from Livermore to the San Joaquin Valley. A short segment (0.2 miles) of new easement would be required.

3.3.3 South Area

Based on the results of the decision analysis process, the routes for the proposed project and those for Alternatives 1, 2, and 3 (described in the following sections) were selected because they were the least environmentally sensitive and most cost effective solutions when compared to all of the other possible combinations of routes that were evaluated. Alternatives 1, 2, and 3 were also developed based on their ability to solve the capacity problem and meet the need for the project. All alternatives, with the exception of the No Project Alternative and Alternative 4, could meet the area's electric needs. Table 3-3 provides a comparison of the Alternatives 1, 2, and 3 against the proposed project for each of the major criteria evaluated during the decision analysis process. Alternative 4 is not included in the table because environmental impacts, cost, and feasibility factors for distributed resources are not known at this time. Section 3.8 provides an analysis of Alternative 4.

All of the alternatives are feasible and would satisfy the electrical needs of the project except for the No Project Alternative. Depending on the timing, Alternative 4 could defer the need for the South Area portion of the project as described in Section 3.8. This deferral would be for 1 to 3 years depending on the rate of growth in the Vineyard distribution planning area. PG&E selected the proposed project because it has the:

- Lowest potential for visual impacts
- Fewest land use conflicts
- Lowest cost of all of the alternatives
- Fewest number of crossings of linear features
- Shortest distance of access roads required

TABLE 3-3

Comparison of South Area Alternatives

	Proposed Project	Alternative 1 Same as Proposed with Reconductoring	Alternative 2 Dublin Substation to Vineyard Substation via Fallon Road	Alternative 3 Iron Horse Trail and Vineyard Avenue
Engineering Feasibility Issues[1]	Minimal construction clearance requirements, 1.5 miles of access road required, 8 crossings	Same as proposed project but a total of 23 crossings are required	Similar construction clearance requirements, 0.5 miles more access road requirements, and more crossings (16) than the proposed project	Similar construction clearance requirements, twice as many miles of access roads as proposed project, highest number of crossings (38)
Primary Environmental Impacts:				
Visual Resources	Less than significant impacts with implementation of mitigation measures for transition structure	Less than significant impacts with implementation of mitigation measures for transition structure	Significant visual impacts from designated scenic roadways	Significant visual impacts from many locations along the Iron Horse Trail and Vineyard Avenue
Land Use and Agricultural Resources	No impact	No impact	Conflict with Livermore Airport flight zone and sand and gravel harvesting zone, conflict with planned park, places restrictions on residential development, removal of Farmland of Local Importance	Livermore Area Park District park crossing required, removal of Farmland of Local Importance
Biological Resources	Potential impacts to wetlands and special status wildlife and aquatic species	Slightly greater potential for impacts to wetlands, sensitive natural communities and special status species than for the proposed project.	Greater potential for special status plant species impacts than for proposed project; potential impact to nesting raptors, less potential for aquatic habitat impacts	Less potential for special status plant species impacts but greater potential for impacts to sensitive natural communities than for proposed project; potential impact to nesting raptors, less potential for aquatic habitat impacts
Water Quality and Hydrology	Crossing of 43 ephemeral streams, 1 perennial stream, 3 stock ponds, 2 wetlands, and 4 potential hazardous materials sites	Crossing of 58 ephemeral streams, 3 stock ponds, 2 wetlands, South Bay aqueduct (twice), 2 perennial streams (Arroyo Valle) and 4 potential hazardous materials sites.	Crossing of 31 ephemeral streams, 5 perennial streams, and 2 stock ponds.	Crossing of 23 ephemeral streams, 5 perennial streams, 1 stock pond, and 10 hazardous materials sites. Conductoring would cross South Bay aqueduct in 2 locations.
Total Cost[2] (in millions)	**$92**	**$94.3**	**$109.4**	**$155.8**

[1] Includes requirements for construction clearances, access roads, and the number of crossings of linear features, e.g., roads, railroads, aqueducts.

[2] Includes cost of connecting transmission lines, substation construction, land cost, civil engineering work, termination, reconductoring, and Vineyard Substation upgrade costs, as applicable for each alternative.

3.4 No Project Alternative

3.4.1 Description

Under the No Project Alternative, there would be no facility upgrades to the electric transmission system or installation of significant local generation. If no new facilities are in place by the year 2002, the electric transmission system will not be able to reliably serve customers in the area based on ISO California Grid Planning Criteria.[1] By 2002, interruption of electric service to customers may be necessary to relieve equipment overload in peak demand periods. By 2002, the system will not be able to serve any new electric customers or additional electric demands of existing customers in the area, even with all power system facilities in service.

With the No Project Alternative, severe and widespread overloading of the existing electric transmission system may occur starting in 2002, leading initially to equipment overheating, and eventually to electrical and/or mechanical failures. Such failures will result in electric service interruptions and may pose safety hazards in some circumstances.[2] To prevent this from happening, it would be necessary to institute a program of controlled load shedding, which means that a portion of the system load would be disconnected to avoid equipment overload or system failures. This will result in interruption of electric service (rotating blackouts) to customers. As customer demand continues to grow in the Tri-Valley area, electric service interruption will become more frequent and widespread due to worsening electric transmission system overload.

3.4.2 Potential Environmental Impacts

As described in Section 2.2, Project Purpose and Need, the proposed project is necessary to meet the local electric demand. If the project is not implemented, direct impacts to the environment would not occur because no new construction would take place. However, if the project is not developed, indirect impacts to human health and safety could potentially occur as a result of prolonged power outages.

The No Project Alternative would not be consistent with the General Plans of the cities in the Tri-Valley area regarding future development in the project service area. Under the No Project Alternative, reliable electrical service to existing, approved, and proposed development would not be provided.

3.4.3 Ability to Meet Project Need

This alternative would not meet the identified electrical needs in the project area. As discussed in Section 2.2, Project Purpose and Need, the existing system will not be able to serve any new electric customers or meet the additional electric demands of existing customers in the year 2002 unless new facilities are added.

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[1] Customer demand forecast and planning studies indicate that by the summer of 2002, the existing electric transmission system serving the Tri-Valley area will not have the capacity to withstand an unplanned outage of one electric transmission circuit.

[2] This could occur, for example, when overheated conductors anneal, elongate, or sag too close to the ground, in violation of the safety requirements specified in CPUC General Order 95.

3.5 Alternative 1

3.5.1 Description

This alternative has the same routing as the preferred project for both the North and South Areas and would include the Phase 2 transmission line from the Tesla Substation to the Contra Costa-Newark transmission line. However, where the preferred alternative relies on the existing Contra Costa-Newark line to supply power to the upgraded Vineyard Substation and new 230 kV line, Alternative 1 includes stringing 9.6 miles of conductor on the existing towers in the Tesla-Newark transmission line corridor in the south, thereby supplying the Vineyard Substation from the existing Tiger Creek-Newark line. This results in a different electric alternative (see Figure 3-2). One new laydown area and up to three pull sites would be required to install the new conductor on the vacant tower line.

3.5.2 Potential Environmental Impacts

The environmental impacts for Alternative 1 would be the same as those described for the proposed project, but there would be some additional potential impacts associated with stringing conductor on PG&E's existing towers in the Tesla-Newark corridor. Stringing new conductor on the existing towers would require crossing 15 ephemeral streams, the South Bay Aqueduct (in two locations), and one intermittent/perennial stream (Arroyo Valle). None of the surface water bodies would be impacted because the towers are already built and the transmission line would span all water bodies.

Potential impacts to vegetation and special status plant species would be greater for this alternative as compared to the proposed project because of the greater amount of native habitat traversed and the presence of sycamore alluvial woodland, a sensitive plant community.

Implementation of this alternative could result in minor and temporary transportation impacts. Several minor roads would be crossed, including Greenville Road, Grant Road, Mines Road, Arroyo Road, and Wetmore Road. These road crossings are in rural areas and would result in minor disruptions to traffic during construction, a less than significant impact.

3.6 Alternative 2

3.6.1 Description

As with the proposed project, the North Area component for Alternative 2 would include the Dublin and North Livermore Substations and a double-circuit 230 kV overhead transmission line to connect the substations to the Contra Costa-Newark line. However, it would not require the Phase 2 transmission line to the Tesla Substation. To provide power to the Vineyard Substation, an overhead/underground 230 kV double-circuit transmission line would be constructed from Dublin Substation to Vineyard Substation via Fallon Road, across Interstate 580, and along El Chorro Road (see Figure 3-3). The 2.2-mile underground portion of the line would be between Milepost K1.1 and K1.15 and J0.6 and J2.7 (see Figure 2-2 for milepost locations)**.** This alternative also requires construction of a 230 kV single-circuit transmission line from San Ramon Substation to Dublin Substation within

PG&E's existing easement to bring two power sources into the Vineyard Substation. Approximately 31 miles of the existing Pittsburg-San Ramon 230 kV line would need to be reconductored with steel supported aluminum cable.

3.6.2 Potential Environmental Impacts

The environmental impacts associated with Alternative 2 would be the same as those for the proposed project for the North Area except that impacts from the Phase 2 transmission line from Tesla to the Contra Costa–Newark transmission line would not occur. Potential impacts that could result if the South Area components of Alternative 2 were implemented are discussed below.

Land Use, Recreation, and Agriculture Resources

Implementation of Alternative 2 would result in more significant impacts when compared to the proposed project. The route would be partially located in a planned park east of the San Ramon Substation, which could restrict the park's future land use. The right-of-way requirements would restrict 13 acres of low-density residential development in the Dougherty Valley along the route from the Dublin Substation to the San Ramon Substation. A small amount (less than one acre) of Farmland of Local Importance would also be removed from production along the same portion of the route by placement of tower foundations. Right-of-way requirements for the transmission line just south of Interstate 580 would restrict approximately 5 acres of residential development in a medium/high density residential zone in Pleasanton. A short segment of this alternative in the vicinity of the El Chorro Road interchange at Interstate 580 would require Federal Aviation Administration (FAA) review. The alignment does not conflict with the FAA's Airspace Advisory Guidelines but should be reviewed due its proximity to Livermore Municipal Airport. A portion of the route would be located in a sand and gravel harvesting zone and could interfere with plant operations during project construction.

Aesthetics

If the South Area components of Alternative 2 were implemented, potentially significant visual impacts would result from the alteration of views seen from Tassajara and Dougherty Roads, both designated scenic roadways, as well as from effects on foreground views seen from the Pine Valley Court residential area. View impacts from Fallon Road would also be potentially significant.

Biological Resources

If this alternative were implemented, potential impacts to vegetation and special status plant species would be greater than those for the proposed project due to the larger amount of native habitat traversed and the presence of central coast riparian scrub, a sensitive plant community. Potential northern harrier nesting habitat could be impacted from development of a transmission line in the rock quarry area, and breeding tricolored blackbirds and breeding yellow warblers could also be affected in the area south of Interstate 580 to the Vineyard Substation. Implementation of Alternative 2 would result in fewer potentially significant aquatic impacts because the transmission line routes, particularly the route south of Interstate 580, contain less aquatic habitat than in the proposed project area. This would reduce the potential for impacts to special status aquatic species.

Hydrology/Water Quality

At least seven pull sites would be needed to re-conductor the line from Pittsburg to San Ramon, and temporary access roads could be required for some of these sites. A total of 31 ephemeral streams, five perennial streams, and two stock ponds would be crossed.

Although impacts to hydrology and water quality would be less than significant with mitigation, Alternative 2 would have a greater potential for causing impacts than the preferred project due to the four additional perennial streams that would be crossed.

Cultural Resources

If Alternative 2 were implemented, impacts to two sites with known cultural resources could potentially occur because the resources are located near the transmission line route just south of Interstate 580. However, a qualified archaeologist would determine the exact location of the sites and ensure that they would be avoided.

Air Quality

As with the proposed project, construction activities could cause temporary and localized air quality impacts from ground disturbance (dust emissions) and construction equipment emissions. Impacts would be reduced to less than significant with implementation of mitigation measures identical to those proposed for the project.

Transportation/Traffic

The Alternative 2 transmission line route would have more transportation impacts than the preferred project. The route crosses several major roadways including:

- Tassajara Road
- Dougherty Road
- Alcosta Boulevard
- Interstate 580

These road crossings would result in additional traffic disruption during project construction. Some temporary disturbance to businesses could occur during construction of the transmission line from San Ramon Substation to the new Dublin Substation, particularly to a nursery located on PG&E property adjacent to the San Ramon Substation. Construction of the underground portion of the transmission line would result in some temporary traffic impacts along Fallon Road and the El Charro/Interstate 580 interchange. Because there are plans to extend Fallon Road to Tassajara Road and upgrade the Fallon Road/Interstate 580 freeway interchange, construction of the transmission line in this location may conflict with future transportation plans in the area.

Noise

As with the proposed project, potential noise impacts would be less than significant during operation of transmission lines for Alternative 2. Noise from construction activities would occur and could be considered significant by some business-owners and residents located nearby. However, noise impacts would be temporary and, with implementation of mitigation measures proposed for the project, would be reduced to less than significant levels.

Geology and Mineral Resources

The Alternative 2 transmission line near the San Ramon Substation would cross a possible trace of the Pleasanton fault. Investigations along the trace, however, have found little evidence of active faulting. The landslide hazards for this alternative could potentially be greater than for the other alternatives but this difference is not quantifiable.

Hazards and Hazardous Materials

Five known or potential hazardous materials sites would be crossed by transmission lines if Alternative 2 were implemented. Appropriate testing would need to be performed before transmission towers or underground lines were installed adjacent to these sites.

Public Services, Utilities, and Service Systems

As with the proposed project, implementation of this alternative would not cause any impacts to public services, utilities, and service systems.

Population and Housing

As with the proposed project, there would not be any impacts to population or housing with implementation of this alternative.

3.7 Alternative 3

3.7.1 Description

As with the proposed project, the North Area components for Alternative 3 would include the Dublin and North Livermore Substations and a double-circuit overhead 230 kV transmission line to connect the substations to the Contra Costa-Newark line. This alternative would not include the Phase 2 transmission line from the Tesla Substation to the Contra Costa-Newark transmission line. The South Area components would take advantage of existing PG&E infrastructure along the Iron Horse Trail and Vineyard Avenue 60 kV lines. The Iron Horse Trail line would be rebuilt to a single-circuit 230 kV transmission line to connect the San Ramon Substation to the Vineyard Substation (see Figure 3-4). The Vineyard Avenue 60 kV line would be rebuilt to a single-circuit 230 kV line from the Vineyard Substation to the Tiger Creek-Newark corridor in the south. New tubular steel towers would replace the 60 kV system within the Tesla-Newark corridor, and the 60 kV system serving the Livermore area would remain.

Other projects that would be necessary due to the conversion of these facilities from 60 kV to 230 kV include: rerouting the San Ramon-Radum line to Vineyard, converting the BART Substation to a 230 kV substation, installing a 230/60 kV transformer at Vineyard Substation, relocating the San Ramon 230/60 kV transformer to Vineyard Substation as a spare bank, and providing 60 kV service to Iuka Substation from the Radum-Livermore 60 kV line.

3.7.2 Potential Environmental Impacts

The potential environmental impacts associated with Alternative 3 would be the same as those for the proposed project for the North Area except that impacts from the Phase 2

transmission line from Tesla to the Contra Costa-Newark transmission line would not occur. Impacts that could result if the South Area components of Alternative 3 were implemented are described in this section.

Land Use, Recreation, and Agriculture Resources

More land use impacts would result from implementation of Alternative 3 than would occur as a result of the proposed project. The Alternative 3 transmission line would be located in a more developed area of Alameda County and would cross through Sycamore Grove Park and Shadow Cliffs Regional Park. Portions of the parks could be closed during construction activities, and the parks' future land use could be physically constrained by the presence of towers. This alternative would also result in the permanent removal of a small amount of Farmland of Local Importance (less than 1 acre). Recreational uses along the Iron Horse Trail would be temporarily impacted by construction activities.

Aesthetics

If Alternative 3 were implemented, significant visual impacts would result from the change in character of views from the Iron Horse Trail and nearby residential areas. Significant visual impacts related to this route's visibility from the BART station area and from roadways, including Route 84, Interstate 580, Vineyard Avenue, and Alcosta, Amador Valley, and Dublin Boulevards, could also result. In addition, the Alternative 3 route would significantly affect views from the Shadow Cliffs Regional Recreation Area and the Walt Disney School Park.

Biological Resources

Potential impacts to vegetation would be greater along the Alternative 3 transmission line route as compared to the proposed project due to the presence of sycamore alluvial woodland and north coast riparian forest, both sensitive plant communities. Potential impacts to special status plant species would be less than those for the proposed project because of the large amount of developed land along this route. For the most part, transmission towers would be placed in previously disturbed areas. This alternative has the potential to impact breeding tricolored blackbirds, breeding yellow warblers, and nesting raptors such as the northern harrier and American kestrel. There is less aquatic habitat along this alternative route and, therefore, less potential for impacts to special status aquatic species.

Hydrology/Water Quality

Alternative 3 would have a higher potential for water quality or hydrologic impact than the preferred project due to the crossing of five intermittent or perennial streams, and ten potential or known existing hazardous waste sites. Adding conductor to the Tiger Creek-Newark line would also require crossing the South Bay aqueduct in two locations.

None of the surface water bodies crossed by the new transmission lines would be impacted because construction would not occur within 100 feet of any surface water bodies. The transmission line would span the water bodies.

Cultural Resources

If Alternative 3 were implemented, three known/recorded cultural resource areas along the northern section of the Iron Horse Trail near Amador Valley Boulevard could potentially be impacted because of the presence of an area with a high probability of archaeological resources. Cultural resource sites are currently not known to exist along the Tiger Creek-Newark corridor.

Air Quality

As with the proposed project, construction activities could cause temporary and localized air quality impacts from ground disturbance (dust emissions) and construction equipment emissions. Impacts would be reduced to less than significant with implementation of mitigation measures identical to those proposed for the project.

Transportation/Traffic

If the South Area component of this alternative were implemented, disruption of local businesses and access restrictions to parking, businesses, residences adjacent to the Iron Horse Trail, and areas near the BART station would occur during construction activities. This route would cross several major thoroughfares including: Alcosta Boulevard, Amador Valley Boulevard, Dougherty Road, Interstate 580, Santa Rita Road, Route 84, and Wetmore Road. As a result, traffic would be temporarily disrupted during these crossings. In addition, the transmission line would be constructed parallel to Vineyard Avenue and Stanley Boulevard. This would result in traffic disruption due to lane closures and traffic control during project construction. Because the City of Pleasanton has plans to relocate Vineyard Avenue in the future, construction of a transmission line in this location would conflict with local transportation plans.

Noise

As with the proposed project, potential noise impacts would be less than significant during operation of transmission lines for Alternative 2. Noise from construction activities would occur and could be considered significant by some business-owners and residents located nearby. However, noise impacts would be temporary, and with implementation of mitigation measures proposed for the project, would be reduced to less than significant levels.

Geology and Mineral Resources

If Alternative 3 were implemented, the transmission line would potentially be subject to seismic impacts along the Iron Horse Trail due to proximity to the Pleasanton Fault. However, potential geological impacts would be similar to those for the proposed project and other alternatives.

Hazards and Hazardous Materials

Eight known or potential hazardous waste sites would be crossed by new transmission lines if Alternative 3 were implemented. Appropriate testing would need to be performed before transmission towers were installed adjacent to these sites.

Public Services, Utilities, and Service Systems

As with the proposed project, there would not be any impacts on public services, utilities, and service systems with implementation of Alternative 3.

Population and Housing

As with the proposed project, there would not be any impacts on population or housing with implementation of this alternative.

3.8 Alternative 4

3.8.1 Description

The North Area component of Alternative 4 would be the same as that for the proposed project; for the South Area, however, traditional "wires" solutions would be replaced with "distributed resources" (DR), including grid generating facilities and peak load management projects. These solutions would involve installing new generating units in the area and/or reducing local electric loads during certain peak load periods.

PG&E commissioned an independent Local Integrated Resources Plan (LIRP) to determine if DR could defer or eliminate the need for the project in the southern Tri-Valley area. The report (see Appendix D for a summary of the LIRP) concluded that while the need for the project in the South Area could not be eliminated, it could be deferred if local distributed generation facilities or peak load management were sited or implemented. As discussed in the LIRP report, to defer the project in the southern Tri-Valley area for up to 3 years, approximately 110 MW of generation or load reduction would be needed under all but the most pessimistic load growth scenario (assuming no new merchant plants in the Bay Area). PG&E studies that assume proposed merchant plants will develop in the Pittsburg area show that approximately 175 MW of generation or load reduction would be needed to defer the project in the southern Tri-Valley area for up to 3 years. After 2005, either additional distributed resources would be needed or a conventional wires and substation solution would need to be built.

To explore these alternate solutions, PG&E is supporting the ISO in pursuing a pilot "non-wires" or DR market-based request for proposals (RFP) in the southern Tri-Valley area. DR includes any small-scale power generation technology or demand side management that provides electric power, or relief, at a site closer to customers than central station generation, resulting in an optimized energy supply based on consumer needs. DR can be interconnected to a utility's transmission or distribution system. Various mid-range distributed generation technologies include turbine generators, internal combustion engines/generators, and wind turbines.

It is anticipated the ISO will issue the RFP in late 1999 to solicit bids from third parties to determine market interest (and requisite incentives) for distributed generation and peak load droppers. The resulting contracts will allow the ISO the right to call for generation or load reduction service when needed. PG&E will not own or operate these resources nor will they directly purchase energy produced at these facilities.

The ISO will seek 175 MW of DR with allowable bids ranging from 5 MW to 50 MW. If for any reason the ISO does not award contracts, including a lack of sufficient bids, PG&E will upgrade the transmission system in the southern Tri-Valley area.

Alternative 4 could meet the needs of the project; however, until the ISO issues an RFP for DR and contracts become effective, PG&E cannot determine the effectiveness of Alternative 4.

3.8.2 Potential Environmental Impacts

Environmental impacts for "non-wires" solutions may vary depending on the project and whether new construction is required. Impacts typically associated with distributed generation facilities (such as gas turbines) include increased air emissions, increased noise levels, and the potential for hazardous waste spills. Sulfur dioxides, unburned hydrocarbons, NO_x, CO, and particulates emitted by the gas turbines can cause air quality impacts. Noise impacts can be caused by the air intakes, gas-turbine generators, and turbine exhausts. Potential visual impacts vary depending on the plant structures, exhaust stacks, cooling towers, steam plume, fuel facilities, and electric facilities to be used at the plant. Hazardous waste impacts can result from aqueous ammonia used with the selective catalytic reduction system to reduce nitric oxide emissions. Other DR options such as fuel cells and peak load management initiatives would reduce some of these environmental impacts. Plant personnel entering and leaving the plant at peak traffic times can cause potential traffic impacts depending on the location of the facility. Distributed generator suppliers will be responsible for obtaining and meeting federal, state, and local permitting requirements. Because the type and location of new distributed generation facilities is speculative and unknown at this time, more specific potential environmental impacts for "non-wires" alternatives cannot be identified.

Insert Figure 3-2. Alternative 1 Transmission Line Routes and Substations

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Insert Figure 3-3. Alternative 2 Transmission Line Routes and Substations

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Insert Figure 3-4. Alternative 3 Transmission Line Routes and Substations

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Even page for Figure 3-4. Alternative 3 Transmission Line Routes and Substations

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