BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

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Application of PACIFIC GAS AND ELECTRIC COMPANY (U 39 E) for a Certificate of Public Convenience and Necessity Authorizing the Construction of the Embarcadero-Potrero 230 kV Transmission Project	Application No._____ A1212004

APPLICATION OF PACIFIC GAS AND ELECTRIC COMPANY FOR A CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY AUTHORIZING THE CONSTRUCTION OF THE EMBARCADERO-POTRERO 230 KV TRANSMISSION PROJECT

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Pursuant to the California Public Utilities Code, the California Public Utilities Commission's ("Commission" or "CPUC") General Order 131-D ("GO 131-D"), and the Commission's Rules of Practice and Procedure, Pacific Gas and Electric Company ("PG&E") respectfully requests that the Commission issue a Certificate of Public Convenience and Necessity ("CPCN") authorizing the construction of the Embarcadero-Potrero 230 kilovolt ("kV") Transmission Project (the "Project").

I. INTRODUCTION

A. Contents of Application

PG&E's Application for the Project consists of this cover pleading, the Proponent's Environmental Assessment ("PEA") submitted herewith, and the other specific materials required by GO 131-D and the CPUC Rules of Practice and Procedure, which are attached as Exhibits A to H, and incorporated herein by reference.

The PEA complies with and provides the information required by CPUC Rule 2.4, GO 131-D, and the Commission's Information and Criteria List. The PEA includes all information necessary for the Commission to evaluate the environmental consequences of the Project in

accordance with the California Environmental Quality Act ("CEQA").

B. Project Overview

The Project involves the construction of a new, single-circuit, 230 kV transmission line between PG&E's Embarcadero Substation and PG&E's Potrero Switchyard. The Project is intended to enhance the reliability of PG&E's electric service to San Francisco, and particularly to the downtown area served by Embarcadero Substation, given the significant adverse impacts that a service outage would have on the citizens and economy of San Francisco.

PG&E's Embarcadero Substation is the sole source of electricity to much of downtown San Francisco including the Financial District, Union Square, North Beach, The Embarcadero, Chinatown, Nob Hill, Telegraph Hill, and the South of Market and North of AT&T Park areas including Rincon Hill, as well as PG&E's Substation J. Of the 30,000 accounts served by Embarcadero Substation and Substation J together, Embarcadero Substation alone directly serves 22,000 account holders, including many of San Francisco's financial and professional services industries, shopping and restaurant districts, major office buildings, hotels, and tourist destinations, as well as approximately 20,000 residential accounts. Embarcadero Substation will be the source of electricity to future development on Rincon Hill and the TransBay Terminal.

Embarcadero Substation is currently fed by two underground 230 kV cables from Martin Substation, installed in 1974. PG&E's Martin-Embarcadero 230 kV cables, like PG&E's underground transmission lines generally, have been very reliable to date. At present, and projected through approximately 2030, either one of the two existing 230 kV cables can deliver enough electricity to meet current and expected demand at Embarcadero Substation.

Nonetheless, this Project addresses various high impact scenarios under which both Martin-Embarcadero cables are out of service, causing a potentially lengthy loss of electricity in

downtown San Francisco. For example, both existing Martin-Embarcadero cables cross areas of high liquefaction potential, leading to the possibility of a major earthquake causing overlapping failures of those cables. As noted above, unlike PG&E's other San Francisco substations, Embarcadero Substation is not tied into PG&E's 115 kV transmission network, so if the two existing Martin-Embarcadero cables are out of service, only a very small number of the affected PG&E customers (representing approximately 10 MW of 305 MW of total load projected in 2016) can be served from another distribution substation.

The Project would construct a third transmission line to the Embarcadero Substation. The Project is approximately 3.5 miles in total length, including approximately 2.5 miles to be installed offshore in the San Francisco Bay (the "Bay"), 0.4 mile to be installed in horizontal directional drills ("HDD") from the Bay to the transition points on land, and approximately 0.6 mile to be installed underground in paved areas. At the northern end, the transition to underground cable in city streets will be located in the lower Embarcadero area near the Bay Bridge, with the HDD passing between Piers 28 and Piers 30-32 to end inland at Spear Street. At the southern end, the cable transition will be located along 23rd Street. PG&E will interconnect the new 230 kV transmission line with the Embarcadero Substation and will install a new 230 kV switchyard adjacent to the existing Potrero Switchyard to accommodate additional substation equipment.

The Project was approved by the California Independent System Operator ("CAISO") on March 23, 2012. If PG&E's proposed schedule, set forth at Exhibit C, is achieved, the Project would be operational by December 2015.

II. PROJECT DESCRIPTION

The Project would be located in the City and County of San Francisco. The Project will

increase the reliability of the existing system by installing a new single-circuit 230 kV AC transmission line between Potrero Switchyard and Embarcadero Substation that is designed to continue operating following a reasonably foreseeable seismic event in the San Francisco area. In lay terms, this design-basis event is a recurrence of the 1906 San Francisco earthquake, more technically described as a moment magnitude ("Mw") 7.8 earthquake on the San Andreas Fault, with a peak ground acceleration determined at the 84th percentile motions (one standard deviation above the median). The three-phase (three conductor) transmission line is designed to carry a continuous load of 400 megavolt amperes ("MVA") (1005 A) and a 48-hour emergency rating of 458 MVA (1150 A).

On land, the three phases will be installed in a single underground duct bank; in San Francisco Bay, the three phases will be installed as three separate cables underneath the Bay floor. PG&E will interconnect the new transmission line into a termination on the upgraded 230 kV bus at Embarcadero Substation and will install a new 230 kV switchyard adjacent to the existing 115 kV Potrero Switchyard. The Project involves both transmission and substation/switchyard construction activities consisting of three major elements:

1. Construction of an approximately 3.5-mile, single-circuit 230 kV three-phase cable system in a submarine configuration, with land-based interconnections to Embarcadero Substation and Potrero Switchyard.

- 0.6 mile of underground 2500 thousand circular mils ("kcmil") cross-linked polyethylene ("XLPE") copper cable installed in a duct bank with polyvinyl chloride ("PVC") conduits from the substations to the landing point for the submarine cable, using open trenching
- 0.4 mile of transitional sections, with 1400 square millimeter ("mm2") (2800 kcmil) XLPE copper cable installed in high-density polyethylene ("HDPE") conduits using HDD

methods, where the submarine cable transitions from on-shore to off-shore

- 2.5 miles of three parallel 1400 mm² (2800 kcmil) XLPE copper submarine cables laid underneath the sea floor of the San Francisco Bay

2. Termination of the new cable into the 230 kV bus at Embarcadero Substation. No new substation work at Embarcadero Substation is required beyond that already underway in a separate reliability project involving design changes and equipment replacement at Embarcadero Substation (the Embarcadero 230 kV Bus Upgrade Project).

3. Construction of a new 230 kV switchyard near the existing Potrero Switchyard at the termination of the new cable and interconnection of the new 230 kV switchyard and the existing 115 kV Potrero Switchyard via two new 230/115 kV transformers. The power to the new 230 kV switchyard is fed from the existing 115 kV switchyard.

In addition, construction will require equipment staging sites, laydown yards, equipment and material storage areas, and areas to temporarily store excavated materials near the substations and land routes.

The on-shore portions of the project, including the two HDD termination points, are located primarily in franchise in city streets or PG&E-owned property with the exception of a portion of the southern landing area. The southern landing location at 23rd Street will require approximately 38,000 square feet of right-of-way acquisition from the shoreline to a gate located approximately 760 feet west from the shoreline. At the northern landing area, the line will pass through City streets and areas owned by the State of California (Caltrans, for the portion under the Bay Bridge). The portion of the submarine route in the San Francisco Bay will require a license from the Port of San Francisco.

Project construction will take place over an approximately 23-month period with initiation

of service targeted for December 2015, and will involve a workforce of 15 to 75 people at any one time. As more fully detailed in Exhibit H, PG&E estimates that the cost of the Project as proposed is approximately $191 million without contingencies.

III. CPCN REQUIREMENTS UNDER GO 131-D, SECTION IX.A.

A. A Detailed Description Of The Proposed Transmission Facilities, Including The Proposed Transmission Line Route And Alternative Routes, If Any; Proposed Transmission Equipment, Such As Tower Design And Appearance, Heights, Conductor Sizes, Voltages, Capacities, Substations, Switchyards, Etc.; And A Proposed Schedule For Certification, Construction, And Commencement Of Operation Of The Facilities.

Pursuant to GO 131-D, Section IX(A)(1)(a) and CPUC Rule 3.1(a) (as incorporated by GO 131-D), PG&E has provided in Section 2 of the PEA (Exhibit B), a detailed description of the proposed transmission facilities and equipment, as well as a schedule for certification, construction and commencement of operations of the facilities included in the Project. In Section 5 of the PEA (Exhibit B), PG&E provides a discussion of alternatives considered. A preliminary schedule, including proposed dates for certification, right-of-way acquisition, construction, and commencement of operation, is attached as Exhibit C.

B. A Map Of Suitable Scale Of The Proposed Routing Location Showing Details Of The Right-Of-Way In The Vicinity Of Settled Areas, Parks, Recreational Areas, Scenic Areas, And Existing Electrical Transmission Lines Within One Mile Of The Proposed Route.

Pursuant to GO 131-D, Section IX(A)(1)(b), and CPUC Rule 3.1(c) (as incorporated by GO 131-D), PG&E provides a map of the Project route showing parks, recreation areas, and scenic areas at Exhibit A. A map showing the location of existing transmission lines within one mile of the Project is included as Figure 2-3 of the PEA (Exhibit B). Maps showing settled areas, including residential development, in the project vicinity may be found at Figures 3-10.2 and 3-10.3 of the PEA (Exhibit B). A map showing the Project location in relation to the broader region

may be found at Figure 2-1 of the PEA (Exhibit B).

C. A Statement Of Facts And Reasons Why The Public Convenience And Necessity Require The Construction And Operation Of The Proposed Transmission Facilities.

Pursuant to GO 131-D, Section IX(A)(1)(c) and CPUC Rule 3.1(e) (as incorporated by GO 131-D), PG&E provides the following statement of why the public convenience and necessity require construction and operation of the Project. PG&E's objectives for the Project, which reflect its purpose and need, are to:

1) Improve reliability of PG&E's 230 kV transmission system in San Francisco by constructing a new 230 kV transmission line between Embarcadero Substation and Potrero Switchyard that provides a high likelihood of continued electric service to downtown San Francisco in the event of overlapping outages on both of the two existing 230 kV transmission lines running between PG&E's Martin and Embarcadero substations. Specifically:

   (a) To increase substantially the likelihood of continued electric service to Embarcadero Substation in the event of concurrent unplanned outages of both existing 230 kV cables, such as might occur following a major seismic event.

   (b) To provide a high likelihood of continued electric service to Embarcadero Substation in the event of a forced outage of one existing 230 kV cable while the other existing 230 kV cable is subject to a planned outage.

2) Construct an economically and technically feasible third 230 kV transmission line to PG&E's Embarcadero Substation along a route, and using construction methods and materials, that increase the likelihood that the new transmission line will remain operable following a major earthquake in the San Francisco Bay Area.

3) Interconnect PG&E's San Francisco 230 kV and 115 kV transmission systems at Potrero Switchyard so that each system reinforces the other system in the event of outages or replacements of existing underground cables.

4) Construct an economically and technically feasible third 230 kV transmission line to PG&E's Embarcadero Substation from Potrero Switchyard, which is the only PG&E substation on the San Francisco 115 kV network that has sufficient capacity to serve current and expected future Embarcadero loads in the event that both existing 230 kV cables into Embarcadero were out of service.

5) In the long term, after the load served from Embarcadero Substation exceeds the capacity of a single existing 230 kV transmission line, improve reliability of PG&E's San Francisco 230 kV transmission system by having in place a new 230 kV transmission line to PG&E's Embarcadero Substation that will allow PG&E to maintain electric service to all customers served from Embarcadero Substation, with any one of the 230 kV transmission lines serving Embarcadero Substation subject to a planned or forced outage.

6) Construct an economically and technically feasible third 230 kV transmission line to PG&E's Embarcadero Substation before either of the two existing 230 kV transmission lines to PG&E's Embarcadero Substation must be replaced, so that downtown San Francisco is not at risk of a single-cable outage causing a prolonged loss of electric service when one of the two existing 230 kV transmission lines must be replaced.

7) Construct a third 230 kV transmission line to PG&E's Embarcadero Substation so that PG&E may allow one of the two existing 230 kV transmission lines serving Embarcadero Substation to be de-energized to allow infrastructure construction without placing downtown San Francisco at risk of a single-cable outage causing a prolonged loss of electric service.

The Project will construct a new, single circuit, 230 kV transmission line between PG&E's Embarcadero Substation and PG&E's Potrero Switchyard to enhance the reliability of PG&E's electric service to San Francisco, and particularly to the downtown area served by Embarcadero

Substation. PG&E's Embarcadero Substation is the sole source of electricity to much of downtown San Francisco, including the Financial District, Union Square, North Beach, The Embarcadero, Chinatown, Nob Hill, Telegraph Hill, and the South of Market and North of AT&T Park areas including Rincon Hill. This area includes many of San Francisco's financial and professional services industries, shopping and restaurant districts, major office buildings, hotels, and tourist destinations, as well as approximately 20,000 residential accounts. Embarcadero Substation also will serve future development on Rincon Hill and at the TransBay Terminal.

Embarcadero Substation is currently fed by two pipe-type 230 kV cables from Martin Substation, installed in 1973. PG&E's Martin-Embarcadero 230 kV cables, like PG&E's underground transmission lines generally, have been very reliable to date. At present, and projected through at least 2030, either one of the two existing 230 kV cables can deliver enough electricity to meet current and expected demand at Embarcadero Substation.

Nonetheless, this Project addresses various low-probability but very high impact scenarios under which both Martin-Embarcadero cables are out of service, causing a potentially lengthy loss of electricity in downtown San Francisco. For example, both existing Martin-Embarcadero cables cross areas of high liquefaction potential, leading to the possibility of a major earthquake causing overlapping failures of those cables. As noted above, unlike PG&E's other San Francisco substations, Embarcadero Substation is not tied into PG&E's 115 kV transmission network, so if the two existing Martin-Embarcadero cables are out of service, only a very small number of the affected PG&E customers (representing approximately 10 MW of 305 MW of total load projected in 2016) can be served from another distribution substation.

The time to restore an inoperable underground pipe-type cable can vary from approximately 8 hours or less (for return of a line in maintenance to service) to as long as 8 weeks

(to repair a single point of physical damage to the cable) or longer. Repair of a damaged Martin-Embarcadero cable is likely to take 7-8 weeks, assuming PG&E has available skilled labor, equipment and replacement cable; repair of a single rupture of the pipe surrounding the cable without damage to the cable itself would take less time. In the event of an earthquake causing liquefaction that damages both Martin-Embarcadero cables, it is uncertain when a single cable could be placed back in service because there may be multiple damaged cable segments that are difficult to find, multiple oil leaks that are difficult to find, debris and other impediments to finding the damaged pipe and cable locations, and insufficient skilled manpower, equipment and spare cable available.

The immediate reliability risks arising from Embarcadero Substation's reliance on the two existing Martin-Embarcadero 230 kV cables as its sole source of electricity, which create the need for the Project, include:

- A major earthquake poses a significant risk of damage to both Martin-Embarcadero cables or the fluid-filled pipelines in which they are located because, although the cables are not co-located, both cables are located in areas of San Francisco expected to be subject to significant liquefaction risk. Physical damage to each cable could take weeks to months to fix, depending upon the type and quantity of damage, the availability of materials and skilled labor in a post-earthquake environment, and the ability of crews to access safely the work site or sites despite likely damage to surrounding structures and infrastructure. PG&E's proposed new Embarcadero-Potrero cable would avoid the high liquefaction areas traversed by the existing cables and is designed to remain operational after a major earthquake. The Project increases the probability that at least one of three cables will remain operational.
- One existing Martin-Embarcadero cable may be out of service due to a planned outage for

maintenance or to accommodate construction of other infrastructure. For example, the City of San Francisco recently requested that one of the Martin-Embarcadero cables be de-energized for approximately four months to accommodate a City sewer project. This project has been deferred temporarily to allow for the permitting and construction of the proposed Embarcadero-Potrero cable. Whenever one cable is on a planned outage, a forced outage of the other cable will force Embarcadero Substation out of service.

- An existing Martin-Embarcadero cable may be forced out of service due to mechanical damage to the fluid-filled pipe containing the cable or also to the cable itself (such damage may occur from a "dig-in" caused by a third party construction project), undetected corrosion, contamination of the pipe fluid, a failure of the pumping station, or faults caused by overheating. Depending upon the nature of the forced outage, it could take hours to months to restore the cable to service. During this time period, a forced outage of the other existing cable will force Embarcadero Substation out of service.

By connecting PG&E's Embarcadero Substation and Potrero Switchyard, the Project will also provide an interconnection for PG&E's San Francisco 230 kV and 115 kV transmission systems. Such an interconnection would provide a number of benefits to PG&E operations and reliability, including: (a) provide the 115 kV system with an additional source of power when the Martin-Embarcadero cables are in operation; (b) facilitate the eventual replacement of the 115 kV cables, some of which are now 55-65 years old; and (c) provide power from the 115 kV system to the 230 kV system if the 115 kV system were operational, but both the Trans Bay Cable ("TBC") and the Martin-Embarcadero cables were not.

In addition to providing an immediate increase in reliability to customers served through Embarcadero Substation, the Project has additional reliability benefits in the long run. At some

point in the future, PG&E likely would be required to install a third cable to Embarcadero Substation to meet the North American Electric Reliability Corporation ("NERC") transmission planning reliability standards approved by the Federal Energy Regulatory Commission ("FERC") as well as the CAISO's planning standards. These additional reliability considerations include:

- At some point, after approximately 2030, unless downtown San Francisco energy usage stops growing, the customer load served by Embarcadero Substation will exceed the capability of one of the existing Martin-Embarcadero 230 kV cables. At that point, PG&E could be forced to drop service to some customers served by Embarcadero Substation if only one of the existing Martin-Embarcadero cables were out of service, depending upon the demand at the time of outage. Having to drop load following the loss of a single transmission line would be a violation of NERC Reliability Standard TPL-002-0b (Category B). Given that current peak load is approximately 280 MW and each existing cable's capability is approximately 400 MW, this situation is not expected soon. However, this situation is anticipated if Embarcadero Substation is served by only two cables. The project will mitigate this future reliability risk while having the immediate benefits noted above.
- At some point, in the long run, the existing Martin-Embarcadero 230 kV cables will need to be replaced. The cables were installed 39 years ago in 1973, have functioned reliably, and many pipe-type transmission cables have continued operating long past the manufacturer's estimated 40-year useful life. However, it is reasonable to expect that, at some point, each will need to be replaced. As the need for replacement becomes evident, PG&E will need to construct a third cable to Embarcadero Substation to ensure reliable electric service. Waiting until one cable is out of service (or suffering repeated failures) before starting a multi-year engineering, permitting, and construction project to install a new cable would not be prudent.

Without the project, during replacement of one of the existing cables, Embarcadero Substation would be forced out of service if the other existing Martin-Embarcadero cable failed. Having to drop load following the loss of a single transmission line would be a violation of NERC Reliability Standard TPL-002-0b (Category B). Constructing a third cable now would address the eventual need for a third cable when the existing cables must be replaced, as well as reduce or eliminate the current risk of overlapping outages of the existing cables.

PG&E has concluded that the value of making the reliability investment reflected in the Project is warranted based upon the risk of an overlapping outage of both existing Martin-Embarcadero cables; the impact that such an outage would have upon its customers in San Francisco; the reduction of risk resulting from the Project; and the estimated cost of mitigating the risk through the Project. The Project will provide a third cable into Embarcadero Substation from Potrero Switchyard rather than Martin Substation. The Embarcadero-Potrero cable also will connect PG&E's 230 kV and 115 kV systems in San Francisco. Potrero Switchyard has a separate source of energy, the TBC, which can provide power so long as it is in operation and a sufficient amount of power reaches Potrero Switchyard through PG&E's 115 kV network to feed the TBC converter station adjacent to the Potrero Switchyard. Future projects contemplated by PG&E and TBC may eliminate even this reliance on the existing 115 kV network.

In its 2011-2012 Transmission Plan, the CAISO similarly concluded: "While the likelihood of the simultaneous loss of both circuits is low, the consequences of the outage are severe and require mitigation."[1/] With respect to the Project, the Transmission Plan states: "The ISO has determined that this project is needed to address the reliability requirements of the area

1/ CAISO 2011-2012 Transmission Plan, Final Version approved March 23, 2012, at p. 107 (available at http://www.caiso.com/Documents/Board-approvedISO2011-2012-TransmissionPlan.pdf).

and is expected to be in-service in 2015."[2/] The minutes from CAISO's March 22-23, 2012 Board of Governors meeting adopting the 2011-2012 Transmission Plan, including CAISO's determination that the Project is needed and should be constructed, are included at Exhibit G.

D. A Detailed Statement Of The Estimated Cost Of The Proposed Facilities.

Pursuant to GO 131-D, Section IX(A)(1)(d) and CPUC Rule 3.1(f) (as incorporated by GO 131-D), PG&E estimates that the total construction cost for the Project will be approximately $191 million before contingencies. A summary and detailed decision-level cost estimate is provided in Exhibit H. Project construction costs are broken down in the following preliminary estimates:

Construction Costs	**Cost ($2012)**
Transmission Line and Embarcadero Interconnection	$118,887,728
Potrero 230 kV GIS Switchyard	$72,237,258
TOTAL CONSTRUCTION COSTS	**$191,124,986**

PG&E estimates that average annual operation and maintenance costs for the Project over a 40-year project life will be as follows:

Operation and Maintenance Costs	**Average Annual Cost ($2012)**
Transmission Line (monitoring, surveying, reporting)	$59,825
Potrero 230 kV GIS Switchyard (monthly, annual, 5-year maintenance)	$17,680
TOTAL ANNUAL O&M COSTS	**$77,505**

PG&E notes that the last cost estimate it submitted in September 2011 to the CAISO as part of the Transmission Plan process was developed prior to the completion of the engineering cost and feasibility studies that resulted in the current, more refined decision-quality cost estimates reflected above and in Exhibit G.

2/ *Id.* at p. 108.

E. Reasons For Adoption Of The Route Selected, Including Comparison With Alternative Routes, Including The Advantages And Disadvantages Of Each.

Pursuant to GO 131-D, Section IX(A)(1)(e), PG&E has included a discussion of the alternatives it considered in Section 5 of the PEA (Exhibit B). That discussion evaluates the advantages and disadvantages of the considered alternatives and provides the reasons for adoption of the route selected.

F. A Schedule Showing The Program Of Right-Of-Way Acquisition And Construction.

Pursuant to GO 131-D, Section IX(A)(1)(f), PG&E provides a preliminary, illustrative schedule for construction and right-of-way acquisition activities in Exhibit C. The final project construction schedule can only be determined once the Commission's staff issue a full Notice to Proceed, all applicant-proposed measures and any other environmental mitigation measures have been taken into account, materials needed for construction have been delivered and are ready for installation, and PG&E's contractors have mobilized and are ready to initiate construction.

The estimated construction duration for the project is approximately 23 months, and PG&E's intent is to complete construction and place the line in service by December 2015. The construction activities included in the attached preliminary schedule include the construction of short on-shore underground land sections from substations to submarine cable ends; HDD construction for the submarine cable landing; submarine cable transportation and installation; and overall cable system testing and commissioning. The duration also conservatively includes hydroplow work only during the San Francisco Central Bay dredging work windows to minimize potential impacts to marine species, if feasible.

Construction will typically occur between 7 a.m. and 8 p.m., or during times that will be set through coordination with the City and County of San Francisco. If trenching work will cause

traffic congestion, the project may require nighttime work to avoid traffic disruption. All applicable regulations, ordinances, and restrictions will be identified and complied with prior to and during construction.

G. A Listing Of The Governmental Agencies With Which Proposed Route Reviews Have Been Undertaken, Including A Written Agency Response To The Applicant's Written Request For A Brief Position Statement By That Agency. (Such Listing Shall Include The Native American Heritage Commission, Which Shall Constitute Notice On California Indian Reservation Tribal Governments.) In The Absence Of A Written Agency Position Statement, The Utility May Submit A Statement Of Its Understanding Of The Position Of Such Agencies.

Pursuant to GO 131-D, Section IX(A)(1)(g), PG&E provides the following information regarding the government agencies with which PG&E has reviewed the proposed Project. While PG&E has provided summaries of its meetings with both local governments and resource agencies, it has appended to this Application written correspondence only with the City and County of San Francisco, as that is the only local government in the Project area, and is consequently the only agency from which PG&E specifically sought input regarding routing alternatives.

PG&E contacted the Native American Heritage Commission ("NAHC") on June 27, 2012 and again on July 6, 2012. The NAHC responded on August 9, 2012, noting that a search of its Sacred Lands Files failed to indicate the presence of Native American cultural resources in the immediate project area and providing a list of recommended contacts who may have additional information concerning archaeological sites or traditional cultural properties near the project area. PG&E sent requests for information to these eight additional contacts. Copies of Native American correspondence can be found in Appendix D to the PEA, which appendix will be provided under separate cover to the CPUC's Energy Division.

City and County of San Francisco (the "City")

On June 27, 2012, PG&E met stakeholders within the City, including: the Department of Public Works; the Planning Department; the Mayor's Office; the Port of San Francisco; and the San Francisco Public Utilities Commission. PG&E also met with representatives of these departments and commissions at various other times during project planning. PG&E discussed the project purpose and need, scope, CPUC permitting process, alternatives, and coordination with other agencies. The City representatives toured the submarine route and alternatives land routes. PG&E understands from these meetings that the City supports the Project because it will increase the reliability of the electrical service provided to its residents and because the operational flexibility it provides will facilitate City infrastructure work. In particular, the City supports expedited approval and construction of the Project to allow a City sewer replacement project in the vicinity of the existing Embarcadero-Martin 230 kV transmission lines to be completed without placing the reliability of downtown San Francisco at undue risk of outage. The City provided input on the routing alternatives and strongly prefers the proposed submarine cable route. The City prefers this route because of increased reliability in a seismic event, its reduced construction impacts to traffic and public transportation, the avoidance of underground utility congestion and conflicts with other City construction projects, and reduced impacts of construction on City neighborhoods. On November 1, 2012, PG&E sent the letter attached as Exhibit E to the City requesting a position statement on the Project. The City responded on December 4, 2012 with the letter attached as Exhibit F.

San Francisco Bay Conservation and Development Commission ("BCDC")

On June 8, 2012, PG&E met with BCDC's Principal Permitting Analyst. During this meeting, PG&E discussed the Project's purpose and need, scope, CPUC permitting process,

coordination with other agencies, and Project schedule. The BCDC Analyst had recently worked on the TBC Project and was familiar with the area and issues involved with high-voltage submarine cable installation. The Analyst suggested that BCDC would likely require an Administrative Permit for the Project to address any potential temporary access issues to the shoreline band within BCDC's jurisdiction.

California Department of Fish and Game ("CDFG")

On July 2, 2012, PG&E had a conference call with CDFG's Marine Division Supervisor-Marine Environmental Review and Environmental Scientist. This meeting was followed by further project discussions with CDFG and other agencies at the United States Army Corps of Engineers ("USACE") Interagency meeting on July 11, 2012. In these meetings, PG&E discussed the Project scope and schedule, CPUC permitting process, and coordination with other agencies. CDFG and PG&E biologists discussed fish species and optimal avoidance measures. CDFG expressed appreciation for PG&E's early outreach and expressed a desire to continue coordinating with the Project team.

United States Army Corps of Engineers

On June 19, 2012, PG&E met with the USACE's South Branch Chief and Permit Manager. During this meeting, PG&E discussed the Project, CPUC permitting process, Project schedule, and coordination with other agencies. The USACE had recently authorized the TBC project, and its representatives were therefore familiar with the general Project area and issues involved with high-voltage submarine cable installation. The USACE representatives stated that they would focus on the potential for impacts to water quality and on navigation. USACE will be also be interested in the views of its sister federal agencies (National Oceanic and Atmospheric Administration and the United States Coast Guard), as well as state and regional resource agencies

and land managers. USACE staff stated that a Nationwide Permit was issued for the TBC project, but noted that PG&E's Project could require either a Nationwide Permit or an Individual Permit under the federal Clean Water Act. The USACE representatives appreciated the early communication and agreed to continue consulting with PG&E going forward.

National Marine Fisheries Service ("NMFS")

On July 3, 2012, PG&E met with two NMFS biologists. PG&E discussed the Project scope and schedule, CPUC permitting process, and coordination with other agencies. NMFS' and PG&E's biologists discussed the potential for impacts to fish in the Project area and the best avoidance measures for the Project. The NMFS biologists did not express significant concerns with the Project and agreed to continue consulting with PG&E going forward.

IV. CPCN REQUIREMENTS UNDER GO 131-D, SECTION X.

GO 131-D, Section X(A) requires PG&E to provide information regarding the measures taken or proposed by PG&E to reduce the potential for exposure to electric and magnetic fields ("EMF") generated by the Project. PG&E will employ "no cost" and specified "low cost" measures to reduce public exposure to EMF in accordance with Commission Decision ("D.") 06-01-042 and PG&E's "EMF Design Guidelines for Electrical Facilities." Although the precise measures that will be employed will not be determined until final engineering is completed, the following are examples of measures that may be adopted as required by D. 06-01-042 and the Design Guidelines:

- Triangular Configuration. The typical configuration for this project will be a triangular placement of the three cables in a duct bank.
- Strategic Line Placement. The trench will be placed within the right of way to reduce magnetic field exposure to buildings along the entire route, except where the location of

existing underground utilities prevent strategic line placement.

- Lowering the trench an additional five-feet. PG&E will lower the onshore trench by five feet where doing so achieves at least a 15 % magnetic field reduction for the underground transmission line near high priority group land uses.

Once the project is approved by the Commission, a Final EMF Management Plan containing the precise EMF measures to be employed will be prepared for the project and submitted to the CPUC. Interested parties may contact PG&E's Project Information Line at 415-973-5530 to receive a copy of the Final EMF Management Plan once it has been prepared. PG&E's Preliminary EMF Management Plan and Checklist for the proposed Project are attached as Exhibit D.

V. CEQA COMPLIANCE AND MINOR MODIFICATIONS IN FINAL PROJECT DESIGN

GO 131-D, Section XVI, and CPUC Rule 2.4 require that the Project comply with CEQA. PG&E submits herewith as Exhibit B its PEA for the Project. The Commission's Energy Division will review the Project in accordance with CEQA and prepare the appropriate CEQA document (a Negative Declaration, Mitigated Negative Declaration, or Environmental Impact Report). The Commission will determine whether the CEQA document was completed in compliance with CEQA and, if so, certify it for the Project.

To avoid incurring significant costs before the Commission approves the Project, final engineering will be performed after the Commission has completed its CEQA review and approved the Project or an alternative thereto. Final engineering sometimes results in minor modifications to the project design. Under CEQA Guideline § 15162(a), a supplemental EIR is required if the lead agency determines that "[s]ubstantial changes are proposed in the project which will require major revisions of the previous EIR or negative declaration due to the

involvement of new significant environmental effects or a substantial increase in the severity of previously identified significant effects."[3/]

PG&E requests that in issuing any CPCN approving the Project, the Commission explicitly order that the Energy Division shall be authorized to determine whether a minor Project modification would result in new significant environmental effects or a substantial increase in the severity of previously identified significant effects. If a proposed change to the approved Project would result in new significant environmental effects or a substantial increase in the severity of previously identified significant effects, then Energy Division would determine that a Petition for Modification of the Commission Decision granting the CPCN must be filed and a supplemental CEQA document must be prepared if the proposed change is pursued. If a proposed change to the approved Project would not result in new significant environmental effects or a substantial increase in the severity of previously identified significant effects, then the Energy Division should be authorized by the Commission's CPCN Decision to grant any requested minor Project modification required during final engineering and construction.

VI. STATUTORY AND PROCEDURAL REQUIREMENTS.

A. The Applicant.

PG&E is, and since October 10, 1905, has been, an operating public utility corporation organized under California law. It is engaged principally in the business of furnishing electric and gas services in California. PG&E's principal place of business is 77 Beale Street, San Francisco, California, 94105.

A certified copy of PG&E's Restated Articles of Incorporation, effective April 12, 2004, is on record before the Commission in connection with PG&E's A.04-05-005, filed with the

3/ 14 Cal. Code Regs. § 15162(a).

Commission on May 3, 2004. These articles are incorporated herein by reference pursuant to Rule 2.2 of the Commission's Rules.

PG&E's most recent Proxy Statement dated April 2, 2012 was filed with the Commission on April 20, 2012 in A.12-04-018, and is incorporated herein by reference. PG&E's balance sheet and an income statement for the three months ending September 30, 2012 were filed with the Commission on November 15, 2012 in Application 12-11-009 and are incorporated herein by reference.

Communications with regard to this Application should be addressed to:

DAVID T. KRASKA
M. GRADY MATHAI-JACKSON
Law Department
Pacific Gas and Electric Company
77 Beale Street, B30A
San Francisco, CA 94105
Telephone: (415) 973-3744
Facsimile: (415) 972-5952
Email: mgml@pge.com

B. Competing Utilities.

CPUC Rule 3.1(b) (as incorporated by GO 131-D) requires an applicant to address utilities, corporations, persons, or other entities with which the proposed construction is likely to compete. This Project is located in entirely within the City and County of San Francisco. The proposed construction lies entirely within the boundaries of PG&E's existing service territory, and as such, will not compete with any other utility, corporation or person.

C. Required Permits.

CPUC Rule 3.1(d) (as incorporated by GO 131-D) requires an applicant to identify the franchises and such health and safety permits as the appropriate public authorities have required or may require for the Project. Significant portions of the route of the proposed Project lie within the

existing franchise rights PG&E has acquired to build facilities within the public rights of way in San Francisco. Additionally, Table 2-7 of the PEA (Exhibit B) lists the potential permits that may be required by other public authorities.

D. Public Notice.

Pursuant to GO 131-D, Section XI.A, notice of this Application will be given within 10 days of filing the Application by mail,[4/] by advertisement,[5/] and by posting[6/]: (1) to certain public agencies and legislative bodies; (2) to owners of property located on or within 300 feet of the project area; (3) by advertisement in a newspaper or newspapers of general circulation; and (4) by posting a notice on-site and off-site at the project location. PG&E has given, or will give, proper notice within the time limits prescribed in GO 131-D.

E. Compliance with Rule 2.5.

CPUC Rule 2.5 provides that an applicant include a deposit, to be applied to the costs the Commission incurs to prepare a negative declaration or an environmental impact report, when the Commission is acting as the lead agency pursuant to CEQA. Pursuant to Rule 2.5, PG&E has calculated the total deposit to be $115,512. Rule 2.5 additionally provides: "Proponent shall pay

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4/ Pursuant to GO 131-D (Section XI.A.1), notice of the filing of an application for a CPCN must be sent by direct mail to "(a) The planning commission and the legislative body for each county or city in which the proposed facility would be located, the CEC, the State Department of Transportation and its Division of Aeronautics, the Secretary of Resources Agency, the Department of Fish and Game, the Department of Health Services, the State Water Resources Control Board, the Air Resources Board, and other interested parties having requested information. The utility shall also give notice to the following agencies and subdivisions in whose jurisdiction the proposed facility would be located: the Air Pollution Control District, the California Regional Water Quality Control Board, the State Department of Transportation's District Office, and any other State or Federal agency which would have jurisdiction over the proposed construction; and (b) All owners of land on which the proposed facility would be located and owners of the property within 300 feet of the right-of-way as determined by the most recent local assessor's parcel roll available to the utility at the time notice is sent[.]"

5/ Pursuant to GO 131-D (Section XI.A.2), publication of the notice of the filing of an application for a CPCN must be "[b]y advertisement, not less than once a week, two weeks successively, in a newspaper or newspapers of general circulation in the county or counties in which the proposed facilities will be located, the first publication to be not later than ten days after filing of' the application[.]"

6/ Pursuant to GO 131-D (Section XI.A.3), notice of the filing of an application for a CPCN must be posted "[b]y posting a notice on-site and off-site where the project would be located."

the applicable deposit in progressive payments due as follows: One-third of the deposit at the time the application or pleading is filed, an additional one-third no later than 120 days after the time the application or pleading is filed, and the remaining one-third no later than 180 days after the time the application or pleading is filed." Therefore, PG&E has provided with this application a check payable to the Commission in the amount of $38,504.16.

F. PG&E's Financial Ability

CPUC Rule 3.1(h) (as incorporated by GO 131-D) asks for: **"**Statements or exhibits showing the financial ability of the applicant to render the proposed service together with information regarding the manner in which applicant proposes to finance the cost of the proposed construction or extension." PG&E will own the assets that comprise the Project, and such assets will be added to PG&E's utility rate base. PG&E intends to finance the Project's estimated cost of approximately $191 million with the same proportion of debt and equity with which all other rate base assets are financed: 46% long-term debt; 2% preferred stock; and 52% common stock.[7/]

PG&E anticipates that the funds to finance the Project will be primarily derived from cash generated by PG&E's operations and, to the extent necessary, from external sources of funds. External sources of funds would come from the issuance of some combination of debt and equity securities. PG&E's ability to fund this Project is demonstrated through PG&E's financial statements contained in PG&E Corporation's Quarterly Report on Form 10-Q filed with the United States Securities and Exchange Commission on October 29, 2012 for the period ending September 30, 2012. PG&E believes that its utility operations will continue to generate substantial cash with which to fund its construction activities, including the Project.

7/ A proposed decision in PG&E's pending Cost of Capital proceeding at the Commission would increase the debt percentage to 47% and decrease the preferred stock to 1%.

G. Proposed Rates for the Project

CPUC Rule 3.1(h) (as incorporated by GO 131-D) asks for a "statement of the proposed rates to be charged for service to be rendered by means of such construction or extension." The Project's costs are for transmission-related services, and PG&E therefore will seek to recover such costs through transmission rates under the jurisdiction of the Federal Energy Regulatory Commission. Accordingly, ratemaking issues are beyond the scope of this Application.

VII. APPLICATION EXHIBITS.

The following Exhibits are attached to this Application:

A. Project Overview Map

B. Proponent's Environmental Assessment (PEA)

C. Preliminary Project Schedule

D. Preliminary Transmission EMF Management Plan and Substation Checklist

E. Letter from PG&E to the City and County of San Francisco Seeking Position Statement, dated November 1, 2012

F. Letter from the City and County of San Francisco to PG&E Providing a Position Statement, dated December 4, 2012

G. Minutes of the March 22-23, 2012 California Independent System Operator Board of Governors Meeting, Which Approved the Project as Part of the 2011-2012 Transmission Plan

H. Decision-Quality Cost Estimate for the proposed Project

VIII. CATEGORIZATION OF PROCEEDINGS AND NEED FOR HEARINGS

Pursuant to CPUC Rule 2.1(c), the Application must contain: "The proposed category for the proceeding, the need for hearing, the issues to be considered, and a proposed schedule. (See Article 7.) The proposed schedule shall be consistent with the proposed category, including a deadline for resolving the proceeding within 12 months or less (adjudicatory proceeding) or 18 months or less (ratesetting or quasilegislative proceeding)." CPUC Rule 7.1(e) provides: "When

a proceeding does not clearly fit into any of the categories as defined in Rules 1.3(a), (d), and (e), the proceeding will be conducted under the rules applicable to the ratesetting category unless and until the Commission determines that the rules applicable to one of the other categories, or some hybrid of the rules, are best suited to the proceeding."

The Commission has consistently found that applications for CPCNs under GO 131-D do not fit within any of the enumerated categories and should therefore be considered as "ratesetting proceedings." Thus, even though transmission rates are set by FERC and are therefore beyond the scope of this proceeding, the Ratesetting rules apply to this Application.

The issue in this proceeding, as set forth in GO 131-D, is whether the Project is necessary to promote the safety, health, comfort, and convenience of the public, and thus is required by the public convenience and necessity.

Whether hearings are needed should be determined after protests, if any, are filed. PG&E's proposed certification schedule is set forth in Exhibit C.

IX. CONCLUSION.

PG&E respectfully requests that the Commission:

1. Issue a Decision and Order granting PG&E a Certificate of Public Convenience and Necessity, certifying an applicable environmental document for the Project, and granting any other permission and authority necessary to construct, operate and maintain the Project.
2. Determine that the public convenience and necessity does now, and will in the future, require the proposed Project.
3. Authorize Energy Division to approve requests by PG&E for minor project modifications that may be necessary during final engineering and construction of the

Project so long as Energy Division finds that such minor project modifications would not result in new significant environmental effects or a substantial increase in the severity of previously identified significant effects.

4. Grant such other and further relief as the CPUC finds just and reasonable.

Dated this 11th day of December, 2012.

Respectfully submitted,

DAVID T. KRASKA
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By: */s/ M. Grady Mathai-Jackson*
M. GRADY MATHAI-JACKSON

Attorneys for Applicant
PACIFIC GAS AND ELECTRIC COMPANY

VERIFICATION

I, the undersigned, declare:

I am an officer of PACIFIC GAS AND ELECTRIC COMPANY, a corporation, and am authorized to make this verification on its behalf. The statements in the foregoing **Application of Pacific Gas and Electric Company for a Certificate of Public Convenience and Necessity Authorizing the Construction of the Embarcadero-Potrero 230 KV Transmission Project** are true of my own knowledge, except as to matters which are stated on information or belief, and as to those matters I believe them to be true.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on December 3, 2012, at San Francisco, California.

/s/ Janet C. Loduca

Janet C. Loduca
Vice President, Environmental

EXHIBIT A

Project Overview Map

Embarcadero-Potrero
230 kV Transmission Project

Exhibit A
Project Overview Map

EXHIBIT B

Proponent's Environmental Assessment

[Proponent's Environmental Assessment (PEA) was filed separately in paper form]

EXHIBIT C

Preliminary Project Schedule

EXHIBIT C

EMBARCADERO-POTRERO 230KV TRANSMISSION PROJECT

PRELIMINARY PROJECT SCHEDULE

CPCN Application submitted	December 11, 2012
Protests and Notice of deficiencies, if any	January 10, 2013
Response to any deficiencies	February 11, 2013 or sooner
Application complete	February 11, 2013 or sooner
Draft Mitigated Negative Declaration (MND) released[1/]	May 1, 2013
Draft MND Public Review Period begins	May 1, 2013
Close of Public Review Period	June 3, 2013
Proposed date for parties to CPCN proceeding to file Opening Testimony with the CPUC on project cost and need.[2/]	June 15, 2013
Mitigated Negative Declaration finalized	July 1, 2013
Proposed date for parties to CPCN proceeding to file Rebuttal Testimony with the CPUC	July 15, 2013
Proposed date for CPUC Evidentiary Hearings, if any	August 15, 2013
Proposed date for parties to CPCN proceeding to file Opening Briefs, if any, with the CPUC	September 3, 2013
Proposed date for parties to CPCN proceeding to file Reply Briefs, if any, with CPUC. Matter is submitted for decision.	September 24, 2013
Proposed date for CPUC to issue proposed decision on CPCN Application	November 5, 2013
Proposed date for parties to the CPCN	November 25, 2013

1/ Because the Proponent's Environmental Assessment submitted with this Application determines that all environmental impacts from the proposed project will be less-than-significant, this certification schedule assumes that the Commission will issue an Initial Study that identifies the need for a Mitigated Negative Declaration rather than an Environmental Impact Report. The Commission will make the final determination regarding the appropriate CEQA process.

2/ The Commission has commonly bifurcated CPCN proceedings into two phases or tracks. In the "CEQA Track," the Commission has prepared the appropriate environmental review document, which also generally addresses the statutory criteria/factors contained in Section 1002 of the California Public Utilities Code. In a separate track, which often includes testimony and has the potential for hearings, the Commission examines the purpose and need of a proposed project in order to determine whether the project merits the issuance of a CPCN. PG&E recommends that this approach be used in the present project to avoid duplication and overlap between the issues raised in the CEQA track and the testimony/hearings track. In particular, PG&E recommends that formal hearings, if any, occur after the public has had an opportunity to comment on the Draft MND and that document is finalized in order to limit the scope of the issues that need to be addressed through the formal hearing process.

proceeding to file comments on CPUC's proposed decision on CPCN Application	
Proposed date for parties to CPCN proceeding to file replies to comments on CPUC's proposed decision on CPCN Application	December 2, 2013
CPCN Decision Adopted and Effective and MND Certified	December 5, 2013
Secondary permits issued by other governmental authorities	December 2013 – May 2014
Acquisition of land rights	August 2012-February 2014
Materials Procurement	November 2012-July 2014
Initial Notice to Proceed / Construction Begins[3/]	February 2014
Construction Complete	December 2015
Project Operational	December 29, 2015

3/ A more detailed construction schedule may be found in Table 2-5 of the PEA appended to the Application as Exhibit B.

EXHIBIT D

Preliminary Transmission EMF Management Plan and Substation Checklist

PRELIMINARY TRANSMISSION EMF MANAGEMENT PLAN EMBARCADERO-POTRERO 230 KV TRANSMISSION PROJECT

I. GENERAL DESCRIPTION OF PROPOSED PROJECT

Project Name: Embarcadero-Potrero 230 kV Transmission Project

Project Lead: Alain Billot

Scope of Work:

The proposed Embarcadero-Potrero 230 kV Transmission Project (the "Project") will include construction, operation and maintenance of a 230 kV transmission line in San Francisco from Embarcadero Substation near the corner of Fremont and Folsom Streets, to Potrero Switchyard near the intersection of Illinois Street and 23rd Street. The project is approximately 3.5 miles in total length, including approximately 2.4 miles installed offshore in the Bay, 0.4 miles installed in horizontal directional drills (HDD) from the Bay to the transition points on land, and approximately 0.6 miles installed underground in city streets.

The submarine portion of the proposed transmission line will typically be buried 6 to 10 feet underneath the floor of the San Francisco Bay, roughly 1,500 to 2,500 feet off the western shoreline. At each end of the submarine portion of the route, transitional sections totaling approximately 0.4 miles will be installed in HDD conduit where the submarine cable transitions from offshore to onshore. At the northern end, the transition to underground cable in city streets will be located in the lower Embarcadero area, with the HDD passing between Piers 28 and Piers 30-32 to end inland at Spear Street. At the southern end, the cable transition will be located along 23rd Street.

A map of the proposed route and the project vicinity may be found at Attachment A to the Application for the Project.

Base Cost of Transmission Line Proposed Project:

The estimated total cost of the Proposed Project (without the EMF mitigation benchmark budget and excluding contingency) is approximately $191,124,986. Four percent of this estimated total cost is approximately $7,645,000.

II. BACKGROUND: CPUC DECISION 93-11-013 AND EMF POLICY

On January 15, 1991, the CPUC initiated an investigation to consider its role in mitigating the health effects, if any, of electric and magnetic fields from utility facilities and power lines. A working group of interested parties, called the California EMF Consensus Group, was created by the CPUC to advise it on this issue. It consisted of 17 stakeholders representing citizens groups, consumer groups, environmental groups, state agencies, unions, and utilities. The Consensus Group's fact-finding process was open to the public, and its report incorporated concerns expressed by the public. Its recommendations were filed with the Commission in March 1992.

In August 2004 the CPUC began a proceeding known as a "rulemaking" (R.04-08-020) to explore whether changes should be made to existing CPUC policies and rules concerning EMF from electric transmission lines and other utility facilities.

Through a series of hearings and conferences, the Commission evaluated the results of its existing EMF mitigation policies and addressed possible improvements in implementation of these policies. The CPUC also explored whether new policies are warranted in light of recent scientific findings on the possible health effects of EMF exposure.

The CPUC completed the EMF rulemaking in January 2006 and presented these conclusions in Decision D.06-01-042:

- The CPUC affirmed its existing policy of requiring no-cost and low-cost mitigation measures to reduce EMF levels from new utility transmission lines and substation projects.

- The CPUC adopted rules and policies to improve utility design guidelines for reducing EMF, and provides for a utility workshop to implement these policies and standardize design guidelines.

- Despite numerous studies, including one ordered by the Commission and conducted by the California Department of Health Services, the CPUC stated "we are unable to determine whether there is a significant scientifically verifiable relationship between EMF exposure and negative health consequences."

- The CPUC said it will "remain vigilant" regarding new scientific studies on EMF, and if these studies indicate negative EMF health impacts, the Commission will reconsider its EMF policies and open a new rulemaking if necessary.

In response to a situation of scientific uncertainty and public concern, the decision specifically requires PG&E to consider "no-cost" and "low-cost" measures, where feasible, to reduce exposure from new or upgraded utility facilities. It directs that no-cost mitigation measures be undertaken, and that low-cost options, when they meet certain guidelines for field reduction and cost, be adopted through the project certification process. PG&E was directed to develop, submit and follow EMF guidelines to implement

the CPUC decision. Four percent of total project budgeted cost is the benchmark in implementing EMF mitigation, and mitigation measures should achieve incremental magnetic field reductions of at least 15%.

III. ELECTRIC AND MAGNETIC FIELDS (EMF)

EMF is a term used to describe electric and magnetic fields that are created by electric voltage (electric field) and electric current (magnetic field). Power frequency EMF is a natural consequence of electrical circuits, and can be either directly measured using the appropriate measuring instruments or calculated using appropriate information.

Electric fields are present whenever voltage exists on a wire, and are not dependent on current. The magnitude of the electric field is primarily a function of the configuration and operating voltage of the line and decreases with the distance from the source (line). The electric field can be shielded (i.e., the strength can be reduced) by any conducting surface, such as trees, fences, walls, buildings, and most types of structures. The strength of an electric field is measured in volts per meter (V/m) or kilovolts per meter (kV/m).

Magnetic fields are present whenever current flows in a conductor, and are not dependent on the voltage of the conductor. The strength of these fields also decreases with distance from the source. However, unlike electric fields, most common materials have little shielding effect on magnetic fields.

The magnetic field strength is a function of both the current on the conductor and the design of the system. Magnetic fields are measured in units called Gauss. However, for the low levels normally encountered near electric utility facilities, the field strength is expressed in a much smaller unit, the milliGauss (mG), which is one thousandth of a Gauss.

Power frequency EMF are present wherever electricity is used. This includes not only utility transmission lines, distribution lines, and substations, but also the building wiring in homes, offices, and schools, and in the appliances and machinery used in these locations. Magnetic field intensities from these sources can range from below 1 mG to above 1,000 mG (1 Gauss).

Magnetic field strengths diminish with distance. Fields from compact sources (i.e., those containing coils such as small appliances and transformers) drop off with distance "r" from the source by a factor of $1/r^3$. For three-phase power lines with balanced currents, the magnetic field strength drops off at a rate of $1/r^2$. Fields from unbalanced currents, which flow in paths such as neutral or ground conductors, fall off inversely proportional to the distance from the source, 1/r. Conductor spacing and configuration also affect the rate at which the magnetic field strength decreases, as well as the presence of other sources of electricity. The magnetic field levels of PG&E's power lines will vary with customer demand.

Magnetic field strengths for typical transmission power line loads at the edge of rights-of-way are approximately 10 to 90 mG.

IV. NO COST FIELD REDUCTIONS TO BE IMPLEMENTED

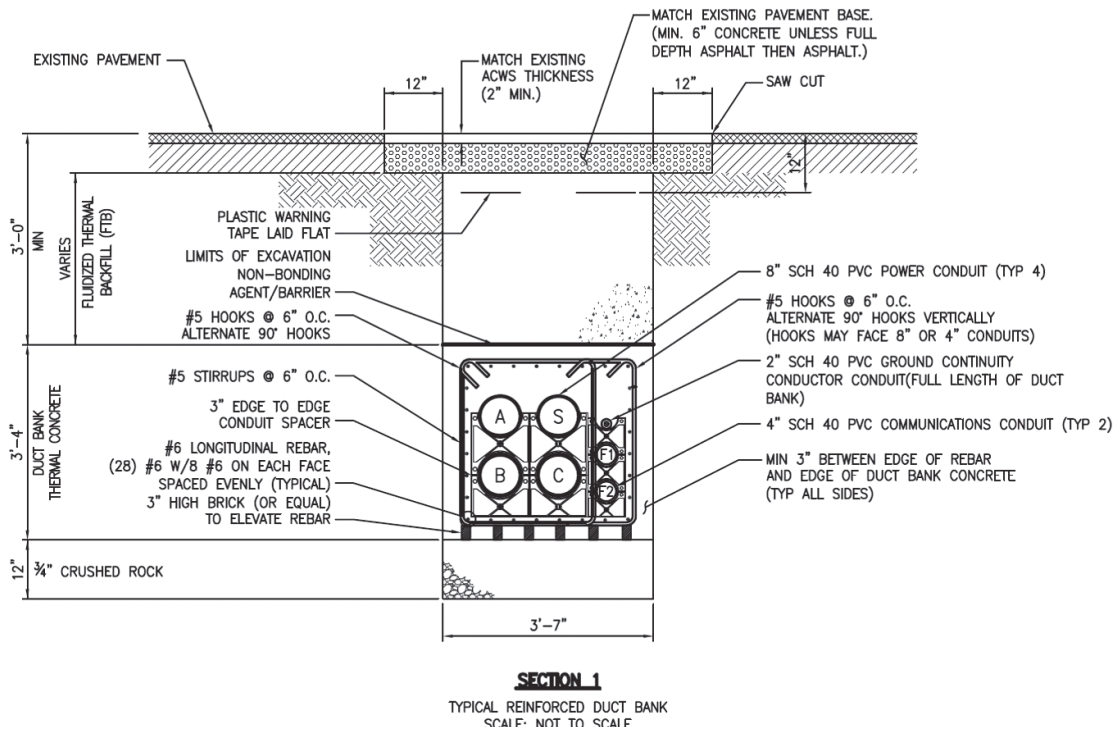
Location of magnetic field calculations: The magnetic field is calculated three feet above the ground at the edge of the right of way. The magnetic field strength depends upon the location along the line at which it is calculated.

Base Case Load Flow:

Embarcadero-Potrero 230 kV: The projected 2022 normal summer peak load current (all lines in service) used for the base case calculation of the magnetic field is 280 Amps, flowing from Embarcadero substation to Potrero substation.

The load currents are assumed to be balanced at 120 electrical degrees separation between the three phases. The loads can vary significantly during the 24 hour day and /or throughout the year.

Typical Duct Bank Configuration (Base Case) Figure 1.



Base Case Field Level at the Centerline: 29.4 mG

Base Case Field Level at 23 feet away: 3.0 mG
(See Table 1 and Graph 1)

Triangular Configuration

The typical configuration for this project will be a triangular placement of the three cables in a 3'4"X 3'7" duct bank. See Figure 1.

Strategic Line Placement

The trench will be placed within the right of way to reduce magnetic field exposure to buildings along the entire route, except where the location of existing underground utilities prevent strategic line placement.

V. PRIORITY AREAS WHERE LOW COST MEASURES ARE TO BE APPLIED

Surrounding Uses by Priority Category:

Pursuant to PG&E's "EMF Design Guidelines for Electrical Facilities", the mitigation of magnetic fields will be applied to the transmission lines in the following priority:

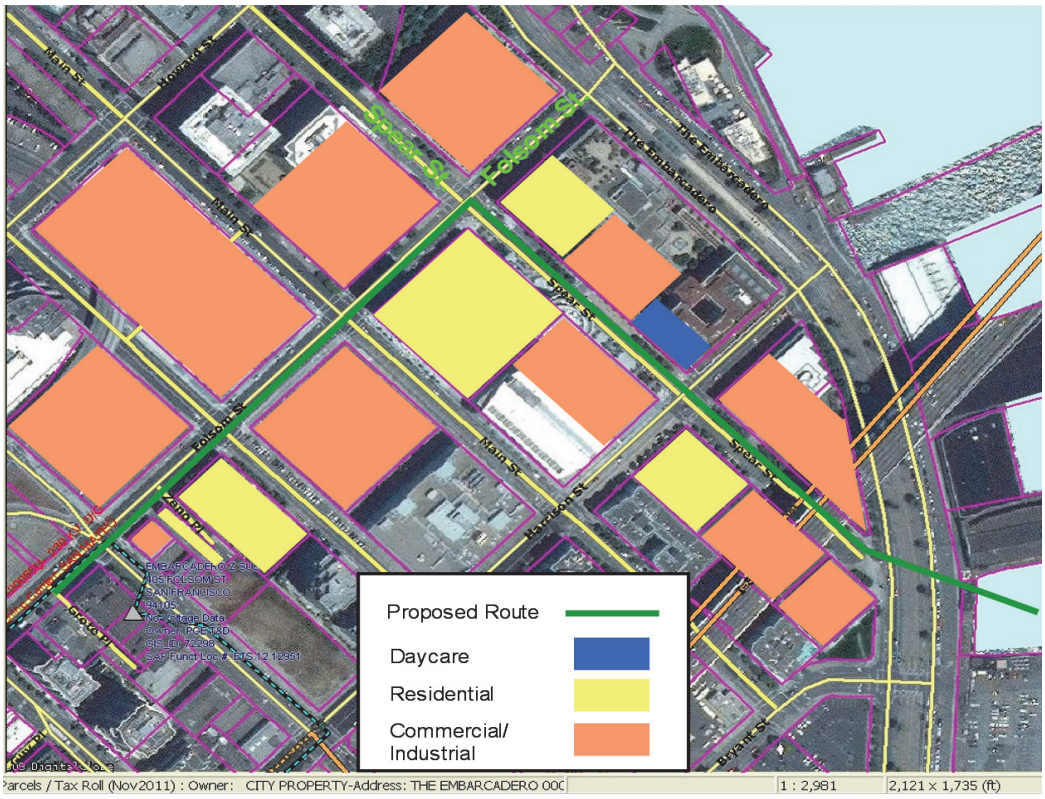
Schools or Daycare
Residential
Commercial/Industrial
Recreational
Agricultural
Undeveloped Land

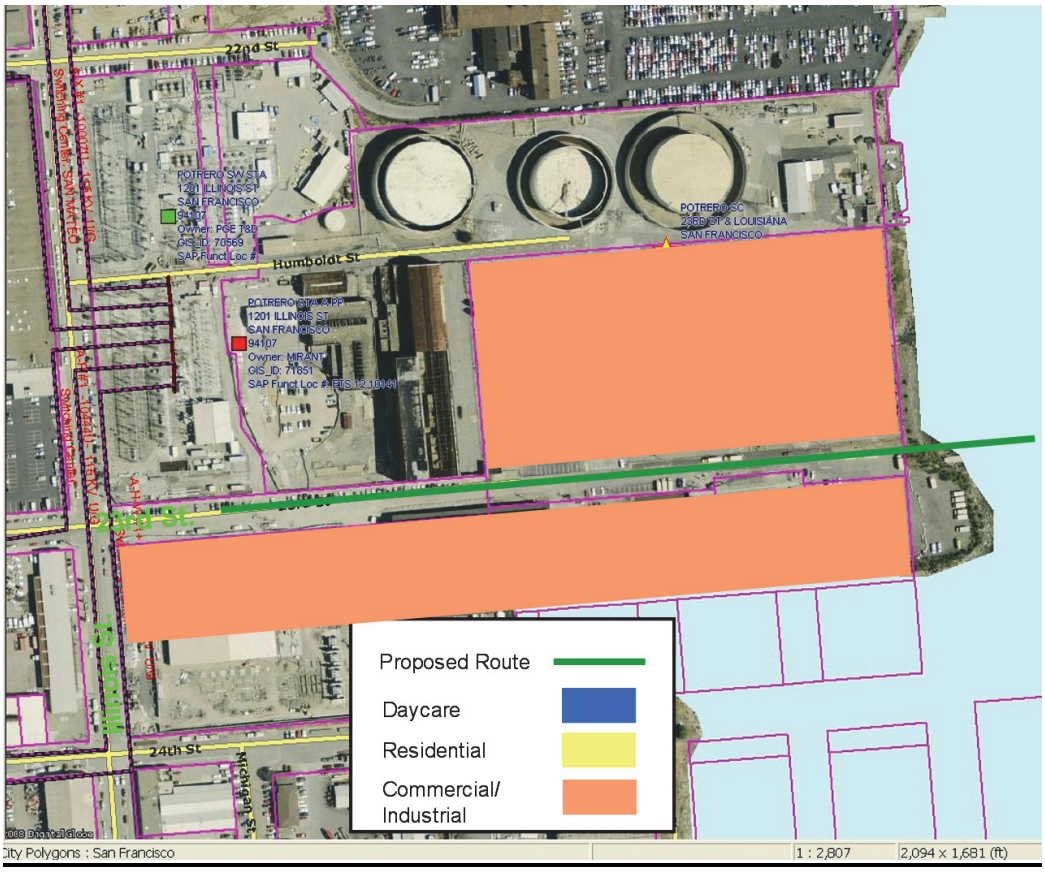
Along the proposed route, between Potrero substation and Embarcadero substation, there is one day care. Listed below is the location:

Marin Day School/Bright Horizons Hills Plaza Campus
2 Harrison Street, Suite 150
SF, 94105

Shown below are the priority groups including day care, and residential land uses along the proposed route where low cost mitigation was considered:

PRELIMINARY TRANSMISSION EMF MANAGEMENT PLAN
EMBARCADERO-POTRERO 230 KV TRANSMISSION PROJECT





VI. LOW COST MAGNETIC FIELD REDUCTION OPTIONS

Mitigate Near Schools and Residential Areas:

Achieve lower magnetic fields at the edge of the right-of-way by moving the conductor further from the edge of the right of way near high priority groups including school, day care, and residential land uses along the proposed route by lowering the depth of the duct bank five feet deeper than otherwise required where this would lower magnetic fields by at least 15 %.

The estimated cost to install a five-foot lower trench that achieves at least a 15 % magnetic filed reduction for the underground transmission line near high priority group land uses is $1,040,000.

Table 0 Low-Cost Reduction Measures Adopted or Rejected

Project Segment	Location (Street, Area)	Adjacent Land Use	Reduction Measure Considered	Measure Adopted? (Yes/No)	Reason(s) if not adopted	Estimated Cost to Adopt
1	Underground trench segment from Bay Bridge to the Embarcadero substation	Daycare and Residential	Lowering trench depth by five feet.	Yes.		$1,040,000
1 & 2	Underground trench segments to the Embarcadero and Potrero substations	Daycare, Residential, and Commercial	Arrange conductors in triangular configuration	Yes		$0
1 & 2	Underground trench segments to the Embarcadero and Potrero substations	Daycare, Residential, and Commercial	Strategic Line Placement	Yes		$0

VII. CONCLUSION: FIELD REDUCTION MEASURES SELECTED

The Embarcadero-Potrero 230 kV Transmission Project field management plan proposes to apply the following no cost and low magnetic field mitigation:

Triangular Configuration

The typical configuration for this project will be a triangular placement of the three cables in a 3'4"X 3'7" duct bank. See Figure 1.

Strategic Line Placement

The trench will be placed within the right of way to reduce magnetic field exposure to buildings along the entire route, except where the location of existing underground utilities prevent strategic line placement.

Lowering the trench an additional five-feet

The estimated cost to install a five-foot lower trench that achieves at least a 15 % magnetic filed reduction for the underground transmission line near high priority group land uses is $1,040,000.

PRELIMINARY TRANSMISSION EMF MANAGEMENT PLAN
EMBARCADERO-POTRERO 230 KV TRANSMISSION PROJECT
230 kV Underground Transmission Line (~6 Foot Trench Depth)

TABLE 1

	Magnetic Field Level Three Feet Above Ground (milliGauss)		
Distance from Center line (feet)	Base Case	Lower Conductors 5 Feet	Percent Reduction
-100	0.2	0.2	1.1%
-99	0.2	0.2	1.1%
-98	0.2	0.2	1.1%
-97	0.2	0.2	1.1%
-96	0.2	0.2	1.0%
-95	0.2	0.2	1.0%
-94	0.2	0.2	1.0%
-93	0.2	0.2	1.4%
-92	0.2	0.2	0.9%
-91	0.2	0.2	1.4%
-90	0.2	0.2	1.4%
-89	0.2	0.2	1.3%
-88	0.2	0.2	1.3%
-87	0.2	0.2	1.3%
-86	0.2	0.2	1.2%
-85	0.2	0.2	1.2%
-84	0.3	0.2	1.6%
-83	0.3	0.3	1.5%
-82	0.3	0.3	1.5%
-81	0.3	0.3	1.5%
-80	0.3	0.3	1.8%
-79	0.3	0.3	1.7%
-78	0.3	0.3	1.7%
-77	0.3	0.3	2.0%
-76	0.3	0.3	1.6%
-75	0.3	0.3	1.9%
-74	0.3	0.3	1.8%
-73	0.3	0.3	1.8%
-72	0.3	0.3	1.7%
-71	0.4	0.3	2.0%
-70	0.4	0.4	2.2%
-69	0.4	0.4	2.1%
-68	0.4	0.4	2.1%
-67	0.4	0.4	2.3%
-66	0.4	0.4	2.5%
-65	0.4	0.4	2.4%
-64	0.4	0.4	2.3%
-63	0.4	0.4	2.7%
-62	0.5	0.4	2.6%
-61	0.5	0.5	2.7%
-60	0.5	0.5	2.8%
-59	0.5	0.5	2.8%
-58	0.5	0.5	3.0%

PRELIMINARY TRANSMISSION EMF MANAGEMENT PLAN
EMBARCADERO-POTRERO 230 KV TRANSMISSION PROJECT
230 kV Underground Transmission Line (~6 Foot Trench Depth)

TABLE 1

	Magnetic Field Level Three Feet Above Ground (milliGauss)		
Distance from Center line (feet)	Base Case	Lower Conductors 5 Feet	Percent Reduction
-57	0.5	0.5	3.1%
-56	0.6	0.5	3.2%
-55	0.6	0.6	3.3%
-54	0.6	0.6	3.5%
-53	0.6	0.6	3.5%
-52	0.7	0.6	3.5%
-51	0.7	0.7	3.7%
-50	0.7	0.7	3.8%
-49	0.7	0.7	4.0%
-48	0.8	0.7	4.2%
-47	0.8	0.8	4.4%
-46	0.8	0.8	4.6%
-45	0.9	0.8	4.8%
-44	0.9	0.9	4.9%
-43	0.9	0.9	5.1%
-42	1.0	0.9	5.4%
-41	1.0	1.0	5.6%
-40	1.1	1.0	5.9%
-39	1.1	1.1	6.2%
-38	1.2	1.1	6.4%
-37	1.3	1.2	6.8%
-36	1.3	1.2	7.1%
-35	1.4	1.3	7.4%
-34	1.5	1.4	7.8%
-33	1.6	1.4	8.2%
-32	1.7	1.5	8.7%
-31	1.8	1.6	9.2%
-30	1.9	1.7	9.7%
-29	2.0	1.8	10.3%
-28	2.1	1.9	10.9%
-27	2.3	2.0	11.6%
-26	2.4	2.1	12.3%
-25	2.6	2.3	13.1%
-24	2.8	2.4	14.0%
-23	3.0	2.6	14.9%
-22	3.3	2.8	15.9%
-21	3.6	3.0	17.1%
-20	3.9	3.2	18.3%
-19	4.3	3.4	19.7%
-18	4.7	3.7	21.2%
-17	5.1	4.0	22.8%

PRELIMINARY TRANSMISSION EMF MANAGEMENT PLAN
EMBARCADERO-POTRERO 230 KV TRANSMISSION PROJECT
230 kV Underground Transmission Line (~6 Foot Trench Depth)

TABLE 1

	Magnetic Field Level Three Feet Above Ground (milliGauss)		
Distance from Center line (feet)	Base Case	Lower Conductors 5 Feet	Percent Reduction
-16	5.7	4.3	24.6%
-15	6.3	4.6	26.5%
-14	7.0	5.0	28.6%
-13	7.8	5.4	30.9%
-12	8.8	5.8	33.5%
-11	9.9	6.3	36.1%
-10	11.1	6.8	39.0%
-9	12.6	7.3	42.0%
-8	14.3	7.9	45.1%
-7	16.3	8.4	48.3%
-6	18.4	9.0	51.4%
-5	20.8	9.5	54.4%
-4	23.2	10.0	57.1%
-3	25.5	10.4	59.4%
-2	27.5	10.7	61.2%
-1	28.9	10.9	62.4%
0	29.4	10.9	62.8%
1	29.0	10.9	62.5%
2	27.7	10.7	61.4%
3	25.8	10.4	59.7%
4	23.4	10.0	57.4%
5	21.0	9.5	54.7%
6	18.6	9.0	51.7%
7	16.4	8.4	48.5%
8	14.4	7.9	45.3%
9	12.7	7.3	42.2%
10	11.2	6.8	39.1%
11	9.9	6.3	36.2%
12	8.8	5.8	33.5%
13	7.8	5.4	31.0%
14	7.0	5.0	28.7%
15	6.3	4.6	26.5%
16	5.7	4.3	24.6%
17	5.1	4.0	22.8%
18	4.7	3.7	21.1%
19	4.3	3.4	19.7%
20	3.9	3.2	18.3%
21	3.6	3.0	17.1%
22	3.3	2.8	15.9%
23	3.1	2.6	14.9%
24	2.8	2.4	14.0%

PRELIMINARY TRANSMISSION EMF MANAGEMENT PLAN
EMBARCADERO-POTRERO 230 KV TRANSMISSION PROJECT
230 kV Underground Transmission Line (~6 Foot Trench Depth)

TABLE 1

	Magnetic Field Level Three Feet Above Ground (milliGauss)		
Distance from Center line (feet)	Base Case	Lower Conductors 5 Feet	Percent Reduction
25	2.6	2.3	13.1%
26	2.4	2.1	12.3%
27	2.3	2.0	11.5%
28	2.1	1.9	10.9%
29	2.0	1.8	10.3%
30	1.9	1.7	9.7%
31	1.8	1.6	9.2%
32	1.7	1.5	8.7%
33	1.6	1.4	8.2%
34	1.5	1.4	7.8%
35	1.4	1.3	7.4%
36	1.3	1.2	7.1%
37	1.3	1.2	6.8%
38	1.2	1.1	6.4%
39	1.1	1.1	6.2%
40	1.1	1.0	5.9%
41	1.0	1.0	5.5%
42	1.0	0.9	5.3%
43	0.9	0.9	5.1%
44	0.9	0.9	4.9%
45	0.9	0.8	4.8%
46	0.8	0.8	4.6%
47	0.8	0.8	4.3%
48	0.8	0.7	4.2%
49	0.7	0.7	4.0%
50	0.7	0.7	3.8%
51	0.7	0.7	3.7%
52	0.7	0.6	3.5%
53	0.6	0.6	3.5%
54	0.6	0.6	3.5%
55	0.6	0.6	3.3%
56	0.6	0.5	3.2%
57	0.5	0.5	3.1%
58	0.5	0.5	3.0%
59	0.5	0.5	2.8%
60	0.5	0.5	2.8%
61	0.5	0.5	2.7%
62	0.5	0.4	2.6%
63	0.4	0.4	2.5%
64	0.4	0.4	2.3%
65	0.4	0.4	2.4%
66	0.4	0.4	2.5%
67	0.4	0.4	2.3%

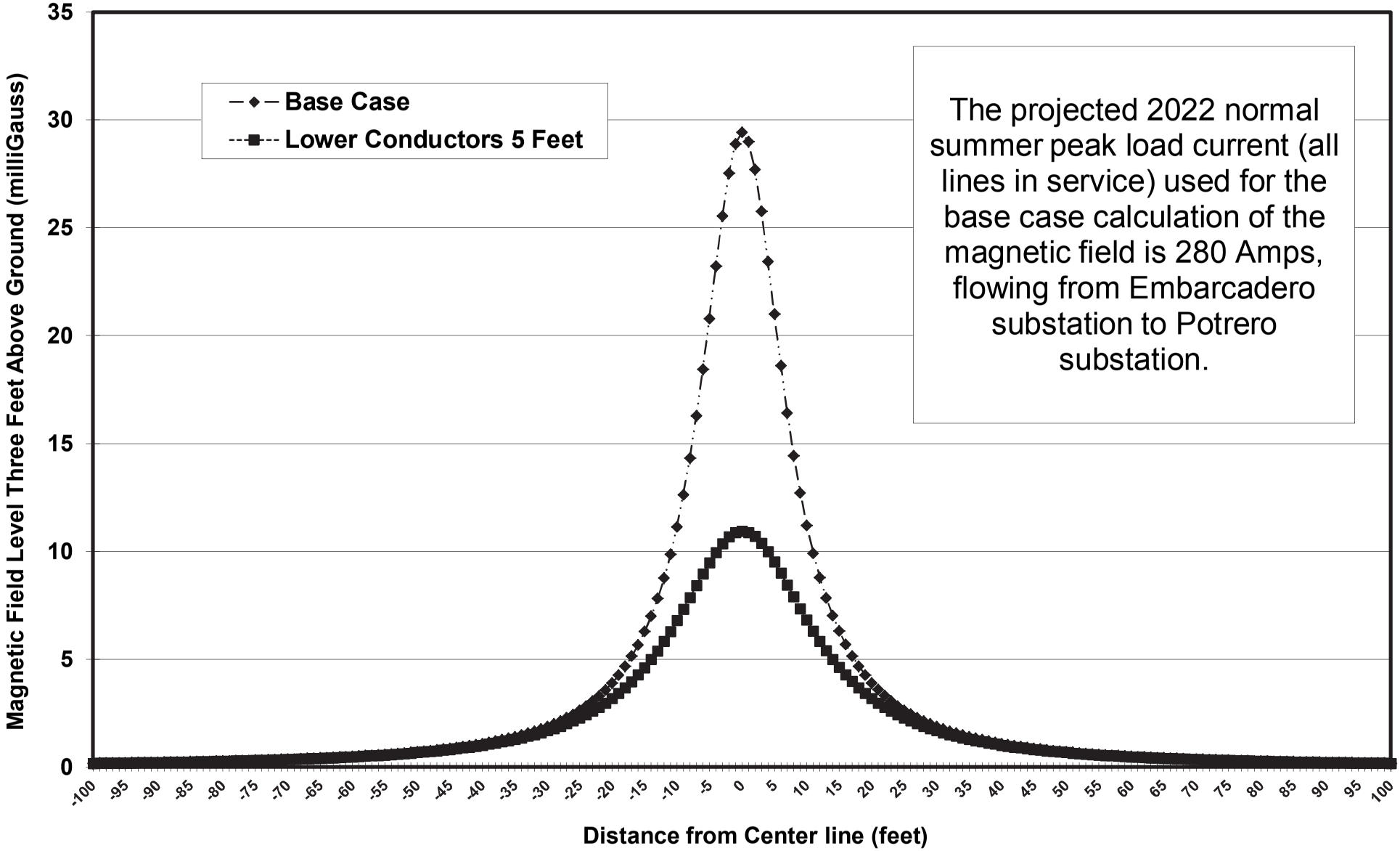
PRELIMINARY TRANSMISSION EMF MANAGEMENT PLAN
EMBARCADERO-POTRERO 230 KV TRANSMISSION PROJECT
230 kV Underground Transmission Line (~6 Foot Trench Depth)

TABLE 1

	Magnetic Field Level Three Feet Above Ground (milliGauss)		
Distance from Center line (feet)	Base Case	Lower Conductors 5 Feet	Percent Reduction
68	0.4	0.4	2.1%
69	0.4	0.4	2.1%
70	0.4	0.4	2.2%
71	0.4	0.3	2.0%
72	0.3	0.3	1.7%
73	0.3	0.3	1.8%
74	0.3	0.3	1.8%
75	0.3	0.3	1.9%
76	0.3	0.3	1.6%
77	0.3	0.3	2.0%
78	0.3	0.3	1.7%
79	0.3	0.3	1.7%
80	0.3	0.3	1.8%
81	0.3	0.3	1.5%
82	0.3	0.3	1.5%
83	0.3	0.3	1.5%
84	0.3	0.2	1.6%
85	0.2	0.2	1.2%
86	0.2	0.2	1.2%
87	0.2	0.2	1.3%
88	0.2	0.2	1.3%
89	0.2	0.2	1.3%
90	0.2	0.2	1.4%
91	0.2	0.2	1.4%
92	0.2	0.2	0.9%
93	0.2	0.2	1.4%
94	0.2	0.2	1.0%
95	0.2	0.2	1.0%
96	0.2	0.2	1.0%
97	0.2	0.2	1.1%
98	0.2	0.2	1.1%
99	0.2	0.2	1.1%
100	0.2	0.2	1.1%

Graph 1

Preliminary Transmission EMF Management Plan
Embarcadero-Potrero 230 kV Transmission Project
230 kV Underground Transmission Line (~6 Foot Trench Depth)



Potrero 230 KV Switchyard - Checklist for a FMP

No.	No-Cost and Low-Cost Magnetic Field Reduction Measures Evaluated for a Substation Project	Measures Adopted? (Yes/No)	Reason(s) if not Adopted
1	Keep high-current devices, transformers, capacitors, and reactors away from the substation property lines.	**Yes**	Based on preliminary design, the equipment are to be located as far as away from the property line as possible.
2	For underground duct banks, the minimum distance should be 12 feet from the adjacent property lines or as close to 12 feet as practical.	**N/A**	No feeder duct banks in this station extension. The routing and location of the UG transmission line and bus sectionalizing connections have not been determined yet since the final design has not been done.
3	Locate new substations close to existing power lines to the extent practical.	Yes	The new GIS will be located adjacent to the existing 115 KV Potrero Switchyard.
4	Increase the substation property boundary to the extent practical.	Yes	PG&E intends to acquire adequate station property, but the size of the parcel is

			limited by amount of land available to procure.
5	Use of 230 and 115 kV Gas Insulated Substation at the new location	Yes	Gas-insulated substation greatly reduces the size of the substation needed and also reduces the bus magnetic and electric fields due to the grounded enclosure for the bus conductors.

EXHIBIT E

Letter from PG&E to the City and County of San Francisco Seeking Position Statement, Dated November 1, 2012

Pacific Gas and Electric Company

ROBERT DONOVAN
SENIOR LAND PLANNER
LAND & ENVIRONMENTAL MANAGEMENT

245 MARKET STREET
SAN FRANCISCO, CA 94109

MAILING ADDRESS:
MAIL CODE N10A
PO BOX 770000
SAN FRANCISCO, CA 94177

November 1, 2012

Ms. Naomi Kelly, City Administrator
1 Dr. Carlton B. Goodlett Place, Rm 362
San Francisco, CA 94102

Re: **Pacific Gas and Electric Company- Embarcadero – Potrero 230kV Transmission Project**

Dear Ms. Kelly;

Thank you once again for the opportunity to review with you PG&E's proposed Embarcadero – Potrero 230kV Transmission Line Project, located in San Francisco. We appreciate the opportunity to seek input regarding the project from the many important stakeholders within the City and County of San Francisco (the "City"), including; Department of Public Works, Planning Department, Mayor's Office, Port of San Francisco and San Francisco Public Utilities Commission. As we discussed during the June 27th tour of the proposed Project facilities and in meetings with City and Port staff before and since that time, the Project will provide a third 230kV source to the critical load served by Embarcadero Substation. By this letter, I am requesting a confirmation of the City's support of the Proposed Project that can be included in the application that PG&E will file shortly with the California Public Utilities Commission ("CPUC") for a Certificate of Public Convenience and Necessity ("CPCN") authorizing the Project.

As you know, Embarcadero Substation is the sole source of electricity to much of downtown San Francisco – including the Financial District, Union Square, North Beach, The Embarcadero, Chinatown, Nob Hill, Telegraph Hill, the South of Market and North of AT&T Park area, Rincon Hill and the Transbay Terminal. PG&E considers the Project a high priority because of the impact that outages would have on downtown San Francisco. The attached map, which is similar to the one PG&E presented at the June 27, 2012 meeting, depicts the project area and the final three routes studied by PG&E for the Project.

We appreciate the input the City has provided on the alignment alternatives and understand that the City strongly prefers the proposed submarine cable route. We understand that this is preferred by the City because of increased reliability in a seismic event. Furthermore, we appreciate the City's position that the submarine route reduces construction impacts to traffic and public transportation, substantially avoids underground utility congestion and conflicts with other construction, and reduces impacts of construction on neighborhoods.

The CPUC's General Order 131-D, Section IX, requires PG&E to consult with local governmental agencies prior to submitting an application for a CPCN, as follows:

> [The applicant shall submit as part of its application for a CPCN a]listing of the government agencies with which proposed route reviews have been undertaken, including a written agency response by that agency. . . . In the absence of a written agency position statement, the utility may submit a statement of its understanding of the position of such agencies."

PG&E herewith respectfully requests a position statement regarding the project from the City. PG&E proposes to file its application in mid-November 2012, or as soon thereafter as reasonably feasible. PG&E expects that after the filing of its application, the CPUC and its consultant will contact the City to request further input regarding the Project, including a request for submittal of comments as part of the environmental review process pursuant to the California Environmental Quality Act.

Thank you for your consideration. Please contact me at 415-973-0301 for further information or send me an email via RJDT@pge.com.

Sincerely,

Bob Donovan

Bob Donovan
Senior Land Planner

EXHIBIT F

Letter from the City and County of San Francisco to PG&E Providing a Position Statement, Dated December 4, 2012

OFFICE OF THE
CITY ADMINISTRATOR

Edwin M. Lee, Mayor
Naomi M. Kelly, City Administrator

December 4, 2012

Mr. Bob Donovan
Senior Land Planner
Pacific Gas and Electric Company
Mail Code 770000
San Francisco, CA 94177

Subject: Pacific Gas and Electric Company – Potrero 230kV Transmission Project

Dear Mr. Donovan:

This letter is written in support of the proposed PG&E installation of a third 230kV source to its Embarcadero Substation. I understand that this letter will be included in the filing made by PG&E with the California Public Utilities Commission, and I am pleased to participate in this public process.

As City Administrator and Chair of the City and County of San Francisco Lifelines Council, I believe the need for an additional transmission cable to the Embarcadero Station is essential to San Francisco's repair and recovery after a seismic event or other disaster. That station serves an area vital to San Francisco's business and cultural life. Disruption of power would be a tremendous blow to public safety and to the economy of both the City and the region.

The City strongly prefers the underwater option for the new cable. Compared to other options, the underwater option causes fewer potential construction-related traffic and environmental impacts to infrastructure and commerce in our downtown area.

We look forward to working with PG&E on environmental review and design of the cable to ensure that placement can be done in an a manner consistent with maritime uses of the area (e.g., ships dropping anchor, potential Port need to construct new piers and seawalls) and using construction methods appropriate for Bay waters.

Thank you for the opportunity to comment. This project will be of benefit to San Francisco.

Sincerely,

Naomi M. Kelly
City Administrator and
Chair, San Francisco Lifelines Council

1 Dr. Carlton B. Goodlett Place, City Hall, Room 362, San Francisco, CA 94102
Telephone (415) 554-4852; Fax (415) 554-4849

EXHIBIT G

Minutes of the March 22-23, 2012 CAISO Board of Governors Meeting, Which Approved the Project As Part of the 2011-2012 Transmission Plan

GENERAL SESSION MINUTES
ISO BOARD OF GOVERNORS MEETING
March 22-23, 2012
ISO Headquarters
Folsom, California

March 22, 2012

The ISO Board of Governors convened the general session meeting at approximately 2:30 p.m. and the presence of a quorum was established.

ATTENDANCE

The following members of the ISO Board of Governors were in attendance:

Bob Foster, Chair
Ashutosh Bhagwat
Angelina Galiteva
Richard Maullin

The following members of the officer team were present: Steve Berberich, Keith Casey, Karen Edson, Brenda Thomas, Eric Schmitt and Nancy Saracino. Petar Ristanovic, Vice President of Information Technology, joined the meeting at approximately 3:00 p.m.

GENERAL SESSION

The following agenda items were discussed in general session:

PUBLIC COMMENT

Nancy Saracino, Vice President and General Counsel, acknowledged receipt of the following public comment letters: David Freeman; California Wind Energy Association, Northern California Power Agency and the Bay Area Municipal Transmission Group; San Francisco Public Utilities Commission; and the Division of Ratepayer Advocates – California Public Utilities Commission.

Ben Davis stated he was a proponent of an initiative to close nuclear plants in California. Mr. Davis discussed his information availability policy request submitted to the ISO and requested that the study requested be prepared at the expense of the ISO. Keith Casey, Vice President of Market and Infrastructure Development,

encouraged Mr. Davis to listen to Management's presentation on the summer operations preparedness to see if it addressed any of his concerns. Ms. Saracino provided the Board an overview of the pending information request and discussed the appeal process under the ISO's information availability policy.

DECISION ON GENERAL SESSION MINUTES

Governor Bhagwat moved for approval of the Board of Governors general session minutes for the February 16, 2012 meeting. The motion was seconded by Governor Maullin and approved 4-0-0.

CEO REPORT

Steve Berberich, President and CEO, provided the Board with an overview of the following sections of his CEO Report: summer grid outlook, transmission plan, flexible capacity procurement and Market Surveillance Committee appointment recommendations.

Neil Millar, Executive Director – Infrastructure Development, provided an overview of the ISO's 2012 summer operations preparedness focused on contingency planning associated with the potential ongoing outage of the San Onofre Nuclear Generating Station (SONGS). Mr. Millar stated that without SONGS, San Diego and Los Angeles reliability would be at risk under heavy load conditions. Mr. Millar noted that activating Huntington Beach units 3 and 4 would mitigate the outage risks under heavy load conditions in both the Los Angeles and San Diego areas. Mr. Millar concluded his presentation by discussing a listing of further actions that could mitigate the outage risk, including conservation and demand response measures.

BRIEFING ON SUMMER LOADS AND RESOURCES OPERATIONS PREPAREDNESS ASSESSMENT

Robert Emmert, Manager – Interconnection Resources, provided an overview of the 2012 summer loads and resources assessment. Mr. Emmert noted the summer assessment addressed peak demands, on-peak resources, reserve margins and load shedding probabilities. Mr. Emmert reviewed diagrams of normal and extreme scenarios for operating reserve margins for 2012. Mr. Emmert noted that probabilities of firm load curtailment have been ~1% or less since 2009 with that trend continuing for 2012. Mr. Emmert concluded his presentation by reviewing the final stages of the annual operation preparedness process.

Public comment

John Geesman, on behalf of Alliance for Nuclear Responsibility, provided comments on summer preparedness efforts for the years to come and noted the importance of

agency collaboration. Mr. Geesman noted concern with nuclear assumptions in the long-term transmission plan. Mr. Geesman also commented on the analyses underway regarding the San Diego outage.

Rochelle Becker, on behalf of Alliance for Nuclear Responsibility, provided comments on the state's responsibility regarding nuclear plants. Ms. Becker discussed the findings of various cost and benefit analyses.

Ben Davis provided additional comments, and noted that the benefits of nuclear power in California did not outweigh the risks. Mr. Davis inquired of Management as to the probability of whether blackouts would occur this summer as a result of the unavailability of the SONGS units. Mr. Casey confirmed that blackouts were a low probability, however circumstances could arise that could change the probability levels. Steve Berberich, President and CEO, clarified that the probability would be high if no further action was taken and the SONGS units remained off-line. Mr. Berberich stated that the ISO did intend to take the necessary mitigation measures for reliability should the SONGS units be unavailable this summer.

Barbara George, on behalf of Women's Energy Matters, provided comments regarding her proposal before the CPUC in the long-term procurement proceeding. Handouts were provided to the Board for reference. Ms. George emphasized the importance of selecting the right type of clean and affordable replacement power in place for nuclear plants. Ms. George requested the ISO's support in looking at a public process to address these matters. Mr. Berberich provided responding comments and noted that the ISO greatly values demand response. Mr. Casey provided responding comments and addressed some of the ongoing collaborative efforts underway in these areas.

Governor Foster provided closing remarks.

DECISION ON TRANSMISSION RELIABILITY MARGIN

Nancy Traweek, Director of System Operations, provided the Board an overview of Management's transmission reliability margin proposal. Ms. Traweek stated that the existing practice of managing real time limits resulted in cutting intertie schedules after granting awards. Ms. Traweek noted that the proposed transmission reliability margin would be an adjustment to the ISO intertie limits and that it would be performed for three operational events prior to the hour-ahead scheduling process: unscheduled loop flow, near term uncertainty in transmission topology, and simultaneous path interactions. Ms. Traweek reviewed the benefits of the proposal and noted that it was supported by stakeholders. Brief discussion followed. No public comment was offered.

Motion

Governor Galiteva:

> ***Moved, that the ISO Board of Governors approves the proposed transmission reliability margin proposal, as described in the***

memorandum dated March 15, 2012; and

Moved, that the ISO Board of Governors authorizes Management to make all necessary and appropriate filings with the Federal Energy Regulatory Commission to implement the proposed tariff change.

The motion was seconded by Governor Bhagwat and approved 4-0-0.

DECISION ON CIRCULAR SCHEDULING

Mark Rothleder, Executive Director of Market Analysis and Development, provided the Board an overview of Management's circular scheduling proposal. Mr. Rothleder stated that stakeholders requested clarification of the ISO's market rules concerning intertie schedules that had source and sink in the same balancing authority area. Mr. Rothleder noted that the proposal removed incentives for circular schedules of single scheduling coordinators, though settlements. Mr. Rothleder reviewed a graph that demonstrated that the proposal balanced commercial activity and market operational impacts depending on the scenario. Mr. Rothleder concluded his presentation by reviewing the stakeholder process and noted there was broad stakeholder support. Brief discussion followed regarding the effect of circular schedules. Brief discussion followed.

Public comment

Kyle Hoffman, on behalf of Powerex, provided comments in support of Management's proposal and commended the work of the ISO throughout the stakeholder process.

Motion

Governor Foster:

Moved, that the ISO Board of Governors approves the policy to implement modifications to the settlement of circular schedules, as described in the memorandum dated March 15, 2012; and

Moved, that the ISO Board of Governors authorizes Management to make all necessary and appropriate filings with the Federal Energy Regulatory Commission to implement the proposed tariff change.

The motion was seconded by Governor Galiteva and approved 4-0-0.

QUARTERLY BRIEFING ON MARKET PERFORMANCE

Mark Rothleder, Executive Director of Market Analysis and Development, provided the Board with a briefing on market performance and noted that market performance had improved in several areas since the December update. Mr. Rothleder noted that price convergence continued to improve when compared to the same period in 2011. Mr.

Rothleder stated that price correction events maintained low levels in February and that bid cost recovery increased in January and February. Mr. Rothleder stated that exceptional dispatch volumes remained relatively low but increased for some months relative to 2010. Mr. Rothleder concluded his report by providing an overview of planned future improvements.

INFORMATIONAL REPORTS

Karen Edson, Vice President of Policy and Client Services, noted the importance of the long-term procurement and resource adequacy proceedings before the CPUC and that pursuing these items was a high priority to the ISO. There were no questions or comments on the remaining reports: regulatory report, operations report, financial report, market performance report, business practice manuals change management report, market surveillance committee update, department of market monitoring report, or the market initiatives release plan.

RECESSED

There being additional general session matters to discuss, the general session was recessed at approximately 4:30 p.m.

RECONVENED

March 23, 2012

The ISO Board of Governors reconvened the general session meeting at approximately 9:00 a.m. and the presence of a quorum was established.

ATTENDANCE

The following members of the ISO Board of Governors were in attendance:

Bob Foster, Chair
Ashutosh Bhagwat
Angelina Galiteva
Governor Maullin joined the meeting at approximately 9:15 a.m.

The following members of the officer team were present: Steve Berberich, Keith Casey, Peter Ristanovic, Karen Edson, Brenda Thomas, Eric Schmitt and Nancy Saracino.

GENERAL SESSION

The following agenda items were discussed in general session:

PUBLIC COMMENT

There was no general public comment offered at this time.

DECISION ON MARKET SURVEILLANCE COMMITTEE APPOINTMENTS

Steve Berberich, President and CEO, provided the Board with an overview the functions of the Market Surveillance Committee and informed the Board that consistent with yesterday's CEO Report, he had the following two member nominations to the Market Surveillance Committee: Dr. James Bushnell and Dr. Shmuel Oren. Brief discussion followed regarding the Board's involvement during the interview process.

Ms. Saracino noted that in response to audit feedback received from the Federal Energy Regulatory Commission, Management modified the Market Surveillance Committee member selection process to limit the Department of Market Monitoring's role in the process.

Motion 1

Governor Galiteva:

> ***Moved, that the ISO Board of Governors re-appoints Dr. James Bushnell to the Market Surveillance Committee for a three-year term beginning April 1, 2012 through March 31, 2015; and***
>
> ***Moved, that the Chief Executive Officer is authorized and directed to enter into an appropriate consulting agreement with Dr. James Bushnell to compensate him for participation on the Market Surveillance Committee.***

The motion was seconded by Governor Bhagwat and approved 3-0-0.

Motion 2

Governor Foster:

> ***Moved, that the ISO Board of Governors appoints Dr. Shmuel Oren to the Market Surveillance Committee for a three-year term beginning April 1, 2012 through March 31, 2015; and***
>
> ***Moved, that the Chief Executive Officer is authorized and directed to enter into an appropriate consulting agreement with Dr. Shmuel Oren to compensate him for participation on the Market Surveillance Committee.***

The motion was seconded by Governor Bhagwat and approved 3-0-0.

PUBLIC COMMENT

Kristin Burford, on behalf of Large Scale Solar Association, provided comments and noted the importance of stakeholder involvement as part of the 2012-13 transmission planning process. Ms. Burford also provided comments regarding the cost allocation

stakeholder process and requested that the guiding principles be Board approved. Keith Casey, Vice President of Infrastructure and Market Development, provided responding comments and stated that both items discussed were ongoing stakeholder processes and encouraged Ms. Burford to provide her input as part of the process.

DECISION ON PAY FOR PERFORMANCE REGULATION

Greg Cook, Director of Market and Infrastructure Policy, provided the Board with an overview of Management's pay for performance regulation proposal. Mr. Cook noted that FERC Order 755 required significant changes in the procurement of frequency regulation. Mr. Cook stated that frequency regulation maintains reliability by balancing load and generation within the 5-minute dispatch. Mr. Cook described how the proposal includes payments based on mileage and accuracy and then further discussed further market design elements of the proposal. Mr. Cook stated that final proposal addresses concerns raised by the stakeholders, the Market Surveillance Committee, and the Department of Market Monitoring. Mr. Cook concluded his presentation by discussing next steps and noted that Management would be requesting FERC authority to extend the implementation date to spring 2013.

Public comment

Don Liddell, on behalf of Energy Storage Association, provided supporting comments on Management's proposal and noted his support to extend the implementation date to spring 2013.

Brief discussion followed and the Board acknowledged appreciation for the feedback on the process and encouraged stakeholders to continue to provide feedback to the Board.

Market Surveillance Committee comment

Jim Bushnell, Member of the Market Surveillance Committee, provided comments in support of Management's proposal and provided highlights of the MSC opinion titled "Opinion on Pay-for-Performance Regulation".

Department of Market Monitoring comment

Eric Hildebrandt, Director of Market Monitoring, provided comments and noted recognition of the concerns with the proposal. Mr. Hildebrandt provided generally support of proposal as a result of mitigation measures taken and noted that the Department of Market Monitoring had worked closely with staff and the Market Surveillance Committee during the process.

Motion

Governor Galiteva:

Moved, that the ISO Board of Governors approves the proposed pay for performance regulation market design, as described in the memorandum dated March 15, 2012; and

Moved, that the ISO Board of Governors authorizes Management to make all necessary and appropriate filings with the Federal Energy Regulatory Commission to implement the proposed tariff change.

The motion was seconded by Governor Bhagwat and approved 4-0-0.

DECISION ON 2011/2012 TRANSMISSION PLAN

Neil Millar, Executive Director – Infrastructure Development, provided the Board with an overview of the 2011-12 transmission plan and clarified that approving the plan meant approving the determinations and recommendations contained in the plan, including three new transmission reliability projects that totaled over $50 million each. Mr. Millar discussed the plan development process and noted that 30 reliability projects had been identified as needed projects. Mr. Millar further described the project elements of the three identified reliability projects over $50 million. Mr. Millar stated that the transmission identified would be able to meet the 33% renewable portfolio standard by 2020. Mr. Millar discussed the competitive solicitation and evaluation processes. Mr. Millar provided an overview of the stakeholder process and highlights of key feedback received.

Public Comment

Bob Smith, on behalf of Arizona Public Service Company and Electric Transmission America LLC, provided supportive comments pertaining to the Delany-Colorado River 500 kV project and supported approval of the transmission plan.

Les Guliasi, on behalf of TransBay Cable, provided the Board with a background overview of TransBay Cable and commended ISO client service staff. Mr. Guliasi noted concern that the plan did not result in any projects that were eligible for competitive solicitation.

Discussion followed regarding upcoming changes to the criteria for competitive solicitation as a result of FERC Order 1000.

P.J. Martinez, on behalf of Pacific, Gas and Electric Company, commended ISO staff on the efforts involved and provided further comments in support of approval of the plan.

Irene Moosen, on behalf of the City and County of San Francisco, provided comments regarding the Embarcadero-Potrero project and requested that the Board defer approval of the project for two months to allow for further review of alternative projects.

Mr. Millar provided responding comments as to why there were no other viable alternatives for the Embarcadero-Potrero project. Mr. Martinez provided additional comments and stated that all viable options had been considered and that the plan needed to move forward. Mr. Casey provided an overview of the permitting process at the CPUC and noted Ms. Moosen would have the opportunity to raise concerns as part of that process.

Martin Hermann, on behalf of 8minutenergy, acknowledged the efforts of ISO staff and commended the stakeholder process. Mr. Hermann provided further supportive comments and requested Board approval of the transmission plan.

Brief discussion followed.

Motion

Governor Maullin:

> ***Moved, that the ISO Board of Governors approves the ISO 2011/2012 transmission plan attached to the memorandum dated March 15, 2012.***

The motion was seconded by Governor Foster and approved 4-0-0.

DECISION ON TRANSMISSION PLANNING PROCESS AND GENERATOR INTERCONNECTION PROCEDURES INTEGRATION PROPOSAL

Lorenzo Kristov, Principal – Market and Infrastructure Policy, provided the Board with an overview of Management's proposal to integrate transmission planning and generator interconnection procedures. Mr. Kristov stated the proposal was the product of an intensive stakeholder process and that it balanced multiple objectives and diverse stakeholder concerns. Mr. Kristov described how the central design concept built on the new 'public policy-driven' transmission category. Mr. Kristov reviewed a diagram that outlined the integration timeline. Mr. Kristov noted that the proposal would have the most impact on new interconnection customers. Mr. Kristov concluded his presentation by discussing the benefits of the proposal and recommended Board approval.

Public comment

Doug Davie, on behalf of Wellhead Electric, provided comments on Management's proposal and noted several concerns with the proposal including anticipated higher costs to consumers as a result of the ISOs interconnection process. Mr. Casey and Mr. Lorenzo provided responding comments.

Janice Frazier-Hampton, on behalf of Pacific Gas and Electric Company, commended the stakeholder process and provided comments in support of Management's proposal. Ms. Frazier-Hampton emphasized the importance of transparency throughout the portfolio development process.

Discussion followed and Mr. Casey provided a high-level overview of the portfolio development process and it was noted there remained opportunities for improvement in the process. Karen Edson, Vice President of Policy and Client Services, provided further comments regarding the process and noted that transparency was a priority for the agencies involved going forward.

Martin Herman, on behalf of 8minutenergy, commended the efforts of the ISO to consolidate the two processes and provided further comments in support of Management's proposal.

Tony Braun, on behalf of California Municipal Utilities Association, commended the work of the ISO. Mr. Braun provided generally supportive comments on the proposal but noted concern regarding projected transmission costs. Mr. Braun noted concerns with the cost benefit analysis and noted the Market Surveillance Committee opinion also identified the issue. Mr. Braun requested that ISO Management provide the Board with regular updates on the queue. Mr. Casey responded that quarterly reports were routinely provided to the Board. Mr. Kristov provided additional responsive comments.

Irene Moosen, on behalf of the City and County of San Francisco, commended the ISO staff and the stakeholder process and noted it was important step in meeting the renewable portfolio standard goals. Ms. Moosen also commented on the projected transmission costs and management of the queue. Ms. Moosen emphasized the importance in conducting a cost benefit analysis. Mr. Casey provided responsive comments.

Kristin Burford, on behalf of Large-Scale Solar Association, acknowledged the efforts of ISO staff during the stakeholder process. Ms. Burford noted several concerns with the proposal, including the proposed $60,000 reimbursement cap for reliability network upgrades. Ms. Burford noted concern with management of the queue and encouraged alignment between the ISO and the CPUC in the long-term procurement process. Mr. Casey and Mr. Kristov provided responsive comments.

Garrett Evans, on behalf of High Desert Power Authority, commended ISO staff and the stakeholder process. Mr. Evans provided further comments in support of Management's proposal and noted the importance of coordination and timing.

David Schiada, on behalf of Southern California Edison, commended ISO staff and the stakeholder process. Mr. Schiada provided supportive comments on Management's proposal and provided an overview of issues that are addressed in the proposal.

Market Surveillance Committee comment

Jim Bushnell, Member of the Market Surveillance Committee, provided comments in support of Management's proposal and provided highlights of the MSC opinion titled "Opinion on the Integration of Transmission Planning and Generator Interconnection Procedures".

Governor Foster, on behalf of the Board, commended the efforts of ISO staff and acknowledged that this is part of an evolutionary process. Governor Foster noted appreciation for the participation of the stakeholders and agreed that cost allocation was an important issue.

Mr. Berberich provided closing remarks and echoed the comments of appreciation to staff and stakeholders. Mr. Berberich noted that transmission costs would continue to be a priority for the ISO.

Motion

Governor Bhagwat:

> ***Moved, that the ISO Board of Governors approves the proposal for integration of the transmission planning process and generator interconnection procedures, as described in the memorandum dated March 16, 2012; and***
>
> ***Moved, that the ISO Board of Governors authorizes Management to make all necessary and appropriate filings with the Federal Energy Regulatory Commission to implement the proposed tariff change.***

The motion was seconded by Governor Foster and approved 4-0-0.

ADJOURNED

There being no additional general session matters to discuss, the general session was adjourned at approximately 11:45 a.m.

EXHIBIT H

Decision-Quality Cost Estimate
for Proposed Project, November 9, 2012

Summary of the Decision-Quality Cost Estimate for the Embarcadero-Potrero 230 KV Transmission Project

Embarcadero-Potrero 230kV Transmission Line
Submarine Route

Transmission Line		
PG&E Actual Costs thru May 2012	**$**	**3,471,281**
PG&E Forecast Cost post May 2012		
PG&E Internal Services:		
Transmission Line Engineering & Design	$	326,420
Civil Engineering & Design	$	261,136
Substation Engineering & Design (Embarcadero Termination)	$	31,462
Project Management	$	421,300
Transmission Planning	$	25,700
Environmental Services	$	238,266
Inspection (Civil & Electrical)	$	261,200
Operations & Maintenance	$	130,350
Testing	$	120,330
	$	**1,816,164**
PG&E Contract Costs & Overheads:		
Contracts	$	3,293,000
Right-of-Way Acquisitions	$	16,500,000
Capitalized A&G, Mapping Overhead	$	1,111,022
Escalation	$	6,208,746
AFUDC	$	8,806,499
	$	**35,919,267**
Estimated EPC Cost (prepared by B&V)		
Engineering & Design	$	3,578,000
Onshore Materials & Installation	$	12,084,732
HDD Materials & Installation	$	15,904,000
Offshore Materials & Design	$	36,413,738
Construction Management	$	5,400,000
	$	**73,380,470**
Electro Magnetic Field (EMF) Reduction		
4% of Total Project Costs	**$**	**4,300,546**
Total Forecast Transmission Line	**$**	**118,887,728**

Potrero Switchyard		
PG&E Actual Costs thru May 2012	**$**	**273,552**
PG&E Forecast Cost post May 2012		
PG&E Internal Services:		
Substation Engineering & Design	$	235,965
Civil Engineering & Design	$	117,983
Project Management	$	210,650
Environmental Services	$	66,185
Inspection (Civil & Electrical)	$	261,200
Operations & Maintenance	$	39,105
Testing	$	240,660
	$	**1,171,748**
PG&E Contract Costs & Overheads:		
Contracts	$	2,350,000
GenOn Property Acquisition	$	1,800,000
Capitalized A&G	$	204,098
Escalation	$	3,774,467
AFUDC	$	5,350,908
	$	**13,479,473**
Estimated EPC Costs (prepared by ABB)		
Substation Materials & Installation	$	19,207,064
Logistics & Support	$	1,939,667
Street Work (Outside Substation)	$	1,484,995
Connection to Existing Station	$	1,544,500
Switchyard Building	$	19,676,000
Other Costs	$	10,697,291
	$	**54,549,517**
Electro Magnetic Field (EMF) Reduction		
4% of Total Project Costs	**$**	**2,762,968**
Total Forecast Potrero Switchyard	**$**	**72,237,258**

Total Estimated Cost - Submarine Route $ 191,124,986

Notes:
1) Indirect and Overhead rates were applied to PG&E direct and B&V base cost totals (ref. PG&E Job Estimate template "Summary
2) No material burden rate was applied to purchased material/equipment because all items will be furnished by Contractors

Detailed Estimate of the Cost for the Construction of the Potrero 230 KV Gas-Insulated Switchyard

Pacific Gas and Electric Company

Job Estimate - Face Sheet

62-6251 (Rev. 02/09)
Capital Accounting

Date: September 21, 2012

Business Area: Utility Operations - Energy Delivery
Receiver Cost Center: TSM&C Martin Sub
Receiver Cost Center No.: 10904

Applicant: Pacific Gas & Electric Company
Job Title: **Embarcadero-Potrero 230kV Line: Potrero Substation**
Location: **San Francisco**
County: 038 - San Francisco County
Regulatory Cat.: 1001 - Capital Electric
Major Work Cat.: 61 - Electric Transmission Substation Capacity
Person in Charge: Alain Billot, Sr. Consulting Project Manager
Job Preparer: Alain Billot, Sr. Consulting Project Manager

Start Date: 03/01/2008
Operative Date: 12/31/2015
Completion Date: 06/30/2016
Accident Rpt. No. (AR): N/A
Planning Order No.: 5731443
Planned Amount: $72,237,258
Project No.: P.02693

Job Summary and Necessity

This job estimate is based on 1) a cost estimate to engineer, procure and construct this project provided by PG&E consultant ABB Inc. as part of the feasibility study they prepared for the Potrero Switchyard portion of the project and and is subject to the limitations described therein, and 2) a cost estimate prepared internally that documents costs to-date and forecast internal PG&E labor, miscellaneous contracts, indirect and overhead costs. This is prepared as an exhibit of the project CPUC CPCN filing. This is a budgetary, "decision quality" job estimate. A "construction quality" job estimate will be developed after CPUC has issued its final switchyard siting decision and the project implementation competitive bidding is complete, forecast early 2014.

Work Breakdown and Cost Summary (See Supplemental Page for Cost and Accounting Detail)

Removal Order No. or Asset No.	Resp. Cost Center	Description	Hours	Total Cost
	Various	Actual Costs thru May 2012	777	332,375
	Various	Forecast PG&E Costs post May 2012	8,050	6,293,550
	Various	Estimated Potrero Cost (prepared by ABB)		62,448,287
		Electro Magnetic Field (EMF) Reduction		3,163,046

Expenditure by Year (excludes contingency)

Year	Prior Years	2012	2013	2014	2015-2016	Total
Capital	$253,422	$150,000	$5,000,000	$35,000,000	$31,833,836	$72,237,258
Expense						

Total Costs	
Cap Install'n	62,907,785
Cap Removal	
Expense	
Mat'l Burden	
Cap A&G	204,098
AFUDC	5,350,908
Escalation	3,774,467
Contingency	
Gross Amount Authorized	72,237,258
Scrap/Re. Mat'l.	
Credits	
Net Amount Authorized	72,237,258

Project Sponsor
Geisha Williams
Sr. VP - Energy Delivery

Sponsor's Representative
Alain Billot
Sr. Consutling Project Manager

Job completion information:
Start Date:
Operative Date:
Completion Date:

Foreman's Signature:

Job Authorization	
Recommend	**Recommend**
Concur	**Concur**
Authorize	**Date Authorized**
Order Number	**30605684**

Job Title: Embarcadero-Potrero 230kV Line: Potrero Substation
Location: San Francisco

Current Burden Rate for Material < $75,000: 18.00%

Order Number: 30605684

Applied Percentage Rate:

									15.00%	8.00%	6.000%					
Removal Order or Asset No.	**Resp. Cost Center**	**Description**	**Hrs**	**Internal Services**	**Material**	**Contract**	**Other**	**Material Burden**	**Capital A&G**	**AFUDC**	**Escal'n**	**Conting.**	**Conting. % by Line Item**	**Scrap**	**Credits**	**Total Cost**
	Various	Actual Costs thru May 2012	777	111,888		161,664			17,790	24,620	16,413					332,375
	Various	Forecast PG&E Costs post May 2012	8,050	1,171,748		2,350,000	1,800,000		186,308	466,189	319,305					6,293,550
	Various	Estimated Potrero Cost (prepared by A			18,414,033	36,135,484				4,625,799	3,272,971					62,448,287
		Electro Magnetic Field (EMF) Reductio					2,762,968			234,300	165,778					3,163,046
		Escalated Amounts		1,360,654	19,518,875	40,965,977	4,836,746									
		Total Cost	8,827	1,283,636	18,414,033	38,647,148	4,562,968		204,098	5,350,908	3,774,467					72,237,258

Pacific Gas and Electric Company

Job Estimate - Detail Sheet: Plant to be Installed

Order Number: 30605684

Embarcadero-Potrero 230kV Line: Potrero Substation
San Francisco

Removal Order or Asset No.	Description	Quantity	Provider Cost Center	Activity	Standard Rate	Hours	SUB-TOTAL AMOUNT (dollars only) Internal Services	Material	Contract	Other	TOTAL ($ only)
	Actual Costs thru May 2012										
	PG&E Internal Labor (Engr, Prj Mgmt, Environmental, Planning, etc..)		Various	Various	144.00	777	111,888				111,888
	Ron Martin Associates						-		70,620		70,620
	ABB Feasibility Study						-		86,544		86,544
	North American Title Company						-		4,500		4,500
	Subtotal Actual Costs thru May 2012					**777**	**111,888**		**161,664**		**273,552**
	Forecast PG&E Costs post May 2012										
	PG&E Internal Labor										
	Substation Engineering & Design		12340	SUBENG	157.31	1,500	235,965				235,965
	Civil Engineering & Design		12340	CIVENG	157.31	750	117,983				117,983
	Project Management		14460	PRJMGT	210.65	1,000	210,650				210,650
	Environmental Services		14531	ENVPLN	132.37	500	66,185				66,185
	Inspection (Civil & Electrical)		13545	INSPSV	130.60	2,000	261,200		1,000,000		1,261,200
	Operations & Maintenance		10484	OPERSV	130.35	300	39,105				39,105
	Testing		12930	TSTING	120.33	2,000	240,660				240,660
	GenOn Property Acquisition									1,800,000	1,800,000
	Environmental Monitoring & Remediation								1,000,000		1,000,000
	External Legal and Experts								350,000		350,000
	Subtotal Forecast PG&E Costs post May 2012					**8,050**	**1,171,748**		**2,350,000**	**1,800,000**	**5,321,748**
	Estimated Potrero Cost (prepared by ABB)										
	Substation Installation										
	Transformer 230/115kV 420MVA							2,750,000	132,000		2,882,000
	Shunt Reactor 230kV							1,000,000	66,000		1,066,000
	GIS 230kV; BAAH, 7 CB's,							5,630,000	810,000		6,440,000
	GIS 115kV; DBSB, 2 CB's,							2,380,000	487,500		2,867,500
	MPAC Equipment							790,000	302,500		1,092,500
	CCVT's							189,000	72,000		261,000
	Fire Suppression/Monitoring Systems							564,800	382,000		946,800
	Station Service & DC Power							484,250	316,750		801,000
	Grounding (250kcmil)							264,000	216,000		480,000
	Excess connections / floor plates							6,000	9,000		15,000
	Floor closure beneath panels & equipment							39,000	162		39,162
	Commissioning							32,400	162,000		194,400
	HV XLPE Cable							1,191,000	817,500		2,008,500
	Weekend / Premium Activities								113,202		113,202
	Logisitics & Support										
	Remove contaminated soil								1,275,000		1,275,000
	Final grading & surfacing								102,667		102,667
	Import soil								33,000		33,000
	Offsite storage; indoor secure warehouse; est 15K sq ft								225,000		225,000
	Equipment Unloading/Loading & Hauling								120,000		120,000
	Forklift rental								84,000		84,000
	Ductbank Installation							10,000	90,000		100,000
	Street (Outside Substation)										
	Duct Bank										
	Utility Locating							10,000			10,000
	Sawcut / Demo pavement								77,000		77,000
	Excavation / load / haul								71,000		71,000
	Duct bank; reinforced concrete encasement								68,000		68,000
	Trench box & plates								10,500		10,500
	Backfill / compaction / replace paving / marking								53,000		53,000
	Cabling										
	115kV 2500kcmil (2400 ft)							648,000	302,400		950,400
	LV Cable Potrero SS to exisiting Switchyard							90,000	120,000		210,000
	Weekend / Premium Activities								35,095		35,095
	Connection to Existing Station										
	Expand Bus to XLPE Cable Terminals										
	115kV GIS Modular Terminations							27,000	36,000		63,000
	115kV Cable to Air Terminations							33,000	54,000		87,000
	Jumpers & Hardware to Bushings & CCVTs							18,000	18,000		36,000
	Support & Foundation for Terminations							30,000	20,000		50,000
	Bus CB's added to end of Expanded Bus										
	Foundation & Structures							30,000	24,000		54,000
	115kV 3000A CB							250,000	15,000		265,000
	LV conduit & cable to manhole (street)								25,000		25,000
	MPAC Equipment										
	230kV & 115kV Protection & Automation Panels							160,000	69,000		229,000
	LV control cable - LCC & banks to MPAC							24,000	24,000		48,000
	Move expanded Bus from west end of 115kV bus							200,000	340,000		540,000
	Remove / replace fencing							4,500	15,000		19,500
	Weekend / Premium Activities								128,000		128,000
	Other Costs										
	Mobilization / Demobilization / Jobsite Facilities / Temp Power								109,819		109,819
	Cost Index (Geographic Location 15% of Construction Labor)								1,114,664		1,114,664
	Estimated Sales Tax (9.25%)							1,559,083			1,559,083
	Engineering - Project, E/M, Civil, P&C								1,797,850		1,797,850
	Management - Project, Site, Safety								1,797,850		1,797,850
	Scheduling - Clearance Coordination								149,821		149,821
	Ministerial Permits								299,642		299,642
	Insurance								425,117		425,117
	EPC Markup (10%)								3,443,445		3,443,445
	Switchyard Building										
	Demolition								38,400		38,400
	Sitework								1,820,312		1,820,312

Pacific Gas and Electric Company

Job Estimate - Detail Sheet: Plant to be Installed

Order Number: 30605684

Embarcadero-Potrero 230kV Line: Potrero Substation
San Francisco

Removal Order or Asset No.	Description	Quantity	Provider Cost Center	Activity	Standard Rate	Hours	SUB-TOTAL AMOUNT (dollars only) Internal Services	Material	Contract	Other	TOTAL ($ only)
	Substructure								2,455,810		2,455,810
	Structure								2,688,857		2,688,857
	Enclosure, Vertical								998,796		998,796
	Enclosure, Horizontal								462,288		462,288
	Support Items								62,563		62,563
	Internals, Vertical								951,730		951,730
	Internals, Horizontal								172,242		172,242
	Finishes, Special								24,192		24,192
	Specialties								37,014		37,014
	Conveying								157,449		157,449
	Plumbing								39,800		39,800
	Fire Protection Systems								389,708		389,708
	HVAC								267,075		267,075
	Electrical								2,028,365		2,028,365
	Special Electrical								1,152,480		1,152,480
	General Conditions								1,873,530		1,873,530
	Design Contingency								2,062,062		2,062,062
	Bonds, Insurance, & Subguard								343,677		343,677
	Overhead & Profit								1,649,650		1,649,650
	Subtotal Estimated Potrero Cost (prepared by ABB)							**18,414,033**	**36,135,484**		**54,549,517**
	Electro Magnetic Field (EMF) Reduction										
	4% of Total Project Costs									2,762,968	2,762,968
	Subtotal Electro Magnetic Field (EMF) Reduction									**2,762,968**	**2,762,968**
Total Order Cost (Excl ESCAL, CONTINGENCY, AFUDC, & OVERHEADS)						**8,827**	**1,283,636**	**18,414,033**	**38,647,148**	**4,562,968**	**62,907,785**

Detailed Estimate for the Procurement and Installation of the Potrero-Embarcadero 230 KV Cable

Pacific Gas and Electric Company

Job Estimate - Face Sheet

62-6251 (Rev. 02/09)
Capital Accounting

Date: September 21, 2012

Business Area: Utility Operations - Energy Delivery
Receiver Cost Center: TSM&C Martin UG
Receiver Cost Center No.: 10934

Applicant: Pacific Gas & Electric Company
Job Title: **Embarcadero-Potrero 230kV Transmission Line**
Location: **San Francisco**
County: 038 - San Francisco County
Regulatory Cat.: 1001 - Capital Electric
Major Work Cat.: 60 - Electric Transmission T-Line Capacity
Person in Charge: Alain Billot, Sr. Consulting Project Manager
Job Preparer: Alain Billot, Sr. Consulting Project Manager

Start Date: 03/01/2008
Operative Date: 12/31/2015
Completion Date: 06/30/2016
Accident Rpt. No. (AR): N/A
Planning Order No.: 5731444
Planned Amount: $118,887,728
Project No.: P.02693

Job Summary and Necessity

This job estimate is based on 1) a cost estimate to engineer, procure, and construct this project provided by PG&E consultant Black & Veatch Construction Inc. as part of the feasibility study they prepared for the line portion of the project and is subject to the limitations described therein and 2) a cost estimate prepared internally that documents costs-to-date and forecast internal PG&E labor, miscellaneous contracts, indirect and overhead costs. This is prepared as an exhibit of the project CPCU CPCN filing. This is a budgetary "decision quality" job estimate. A "construction quality" job estimate will be developed after CPUC has issued its final routing decision and theproject implementation competitive bidding is complete, forecast early 2014.

Work Breakdown and Cost Summary (See Supplemental Page for Cost and Accounting Detail)

Removal Order No. or Asset No.	Resp. Cost Center	Description	Hours	Total Cost
	Various	Actual Costs Feb 2008 thru May 2012	4,196	4,076,508
	Various	Forecast PG&E Costs post May 2012	11,800	25,881,993
	Various	Estimated Submarine Route Cost (prepared by B&V)		84,005,962
		Electro Magnetic Field (EMF) Reduction		4,923,265

Expenditure by Year (excludes contingency)

Year	Prior Years	2012	2013	2014	2015-2016	Total
Capital	$3,249,621	$2,500,000	$6,500,000	$18,000,000	$88,638,107	$118,887,728
Expense						

Total Costs	
Cap Install'n	103,479,101
Cap Removal	
Expense	
Mat'l Burden	
Cap A&G	393,382
AFUDC	8,806,499
Escalation	6,208,746
Contingency	
Gross Amount Authorized	118,887,728
Scrap/Re. Mat'l.	
Credits	
Net Amount Authorized	118,887,728

Project Sponsor
Geisha Williams
Sr. VP - Energy Delivery

Sponsor's Representative
Alain Billot
Sr. Consutling Project Manager

Job completion information:
Start Date:
Operative Date:
Completion Date:

Foreman's Signature:

Job Authorization

Recommend	**Recommend**
Concur	**Concur**
Authorize	**Date Authorized**
Order Number	**30605686**

Job Title: Embarcadero-Potrero 230kV Transmission Line
Location: San Francisco

Current Burden Rate for Material < $75,000: 18.00%

Order Number: 30605686

Applied Percentage Rate:

									15.50%	8.00%	6.000%					
Removal Order or Asset No.	**Resp. Cost Center**	**Description**	**Hrs**	**Internal Services**	**Material**	**Contract**	**Other**	**Material Burden**	**Capital A&G**	**AFUDC**	**Escal'n**	**Conting.**	**Conting. % by Line Item**	**Scrap**	**Credits**	**Total Cost**
	Various	Actual Costs Feb 2008 thru May 2012	4,196	578,125		2,861,781	31,375		94,986	301,964	208,277					4,076,508
	Various	Forecast PG&E Costs post May 2012	11,800	1,816,164		3,293,000	17,217,640		298,396	1,917,185	1,339,608					25,881,993
	Various	Estimated Submarine Route Cost (prep			30,039,597	43,340,873				6,222,664	4,402,828					84,005,962
		Electro Magnetic Field (EMF) Reductio					4,300,546			364,686	258,033					4,923,265
		Escalated Amounts		2,537,946	31,841,973	52,465,393	22,842,535									
		Total Cost	15,996	2,394,289	30,039,597	49,495,654	21,549,561		393,382	8,806,499	6,208,746					118,887,728

Pacific Gas and Electric Company

Job Estimate - Detail Sheet: Plant to be Installed

Order Number: 30605686

Embarcadero-Potrero 230kV Transmission Line
San Francisco

Removal Order or Asset No.	Description	Quantity	Provider Cost Center	Activity	Standard Rate	Hours	SUB-TOTAL AMOUNT (dollars only) Internal Services	Material	Contract	Other	TOTAL ($ only)
	Actual Costs Feb 2008 thru May 2012										
	PG&E Internal Labor (Engr, Prj Mgmt, Environmental, Planning, etc..)		Various	Various	137.78	4,196	578,125				578,125
	Mapping Overhead						-			31,375	31,375
	External Legal & Experts						-		631,772		631,772
	Kleinfelder (Peer Review)						-		8,737		8,737
	CH2M Hill (PEA)						-		195,475		195,475
	Black & Veatch Feasibility Study						-		1,885,621		1,885,621
	UC Berkeley Seismic Study						-		104,353		104,353
	Burns & McDonnell Engineering (Peer Review)						-		20,745		20,745
	ABB Feasibility Study for Embarcadero Termination						-		15,078		15,078
	Subtotal Actual Costs Feb 2008 thru May 2012					**4,196**	**578,125**		**2,861,781**	**31,375**	**3,471,281**
	Forecast PG&E Costs post May 2012										
	PG&E Internal Labor										
	Transmission Line Engineering & Design		15021	LINENG	163.21	2,000	326,420				326,420
	Civil Engineering & Design		15021	CIVENG	163.21	1,600	261,136				261,136
	Substation Engineering & Design (Embarcadero Termination)		12340	SUBENG	157.31	200	31,462				31,462
	Project Management		14660	PRJMGT	210.65	2,000	421,300				421,300
	Transmission Planning		12661	MANAGE	128.50	200	25,700				25,700
	Environmental Services		14531	ENVPLN	132.37	1,800	238,266				238,266
	Inspection (Civil & Electrical)		13545	INSPSV	130.60	2,000	261,200		1,000,000		1,261,200
	Operations & Maintenance		10484	OPERSV	130.35	1,000	130,350				130,350
	Testing		12930	TSTING	120.33	1,000	120,330				120,330
	Mapping Overhead									717,640	717,640
	External Legal & Experts								668,000		668,000
	CH2M Hill (PEA)								315,000		315,000
	Black & Veatch Feasibility CPCN Support								215,000		215,000
	UC Berkeley Seismic Study								175,000		175,000
	Burns & McDonnell Engineering								70,000		70,000
	Right-of-Way Acquisitions									16,500,000	16,500,000
	Environmental Monitoring								350,000		350,000
	Embarcadero Termination								500,000		500,000
	Subtotal Forecast PG&E Costs post May 2012					**11,800**	**1,816,164**		**3,293,000**	**17,217,640**	**22,326,804**
	Estimated Submarine Route Cost (prepared by B&V)										
	Engineering & Design										
	Topographical Survey/Soil Exploration								698,000		698,000
	Engineering & Technical Support								2,880,000		2,880,000
	Offshore Cable System Materials & Installation										
	230kV, 1400mm2 Cu Cable	44,236 FT						18,402,010	8,847,120		27,249,130
	Spare 230kV, 1400mm2 Cu Cable	5000 FT						2,080,000			2,080,000
	Cable Transition Joints	6						480,000	900,000		1,380,000
	Spare Cable Joints	2						160,000			160,000
	Spare Cable Repair Joints	4						320,000			320,000
	Field Testing							30,000	100,000		130,000
	Mobilization/Demobilization								3,000,000		3,000,000
	Offshore Communications Systems										
	Fiber Optic Cable (48 Fiber)	29,594 FT						1,775,664	295,944		2,071,608
	Splicing	4						2,000	10,000		12,000
	Fiber-optic Pull Boxes	4						3,000	8,000		11,000
	Onshore Cable System Materials & Installation										
	230kV, 2500 kcmil Seg. Cu Cable	11,532 FT						1,775,928	172,980		1,948,908
	Spare 230kV, 2500 kcmil Seg. Cu Cable	2,000 FT						308,000			308,000
	230kV Cable Terminations - GIS	6						66,000	180,000		246,000
	Spare Cable Term-GIS	2						22,000	75,000		97,000
	Cable Joints	3						19,800			19,800
	Spare Cable Joints	2						13,200			13,200
	Surge Arresters	6						30,212	36,657		66,869
	3Ph Link Box w/SVL's	3						9,900	4,281		14,181
	3Ph Link Box w/o SVL's	3						6,600	4,275		10,875
	1Ph Link Box w/SVL's	3						6,199	3,288		9,487
	1Ph Link Box w/o SVL's	3						3,630	3,288		6,918
	Ground Continuity Conductor (250 kcmil)	3,820 FT						57,300	11,460		68,760
	Field Testing							5,000	30,000		35,000
	Mobilization/Demobilize (Cable)								100,000		100,000
	Onshore Communications										
	Fiber Optic Cable (48 Fiber)	8.160 FT						24,480	29,621		54,101
	Splice Enclosure	4						3,600	1,200		4,800
	Fiber-optic Patch Panels	4						3,200	1,600		4,800
	Splicing	8						4,000	20,000		24,000
	Fiber-optic Pull Boxes	2						1,500	4,000		5,500
	Distributed Temperature Sensing										
	Splice Enclosure	2						1,800	600		2,400
	Splicing	4						2,000	10,000		12,000
	DTS Racking	1						550	500		1,050
	DTS Monitoring System	1						241,000	24,084		265,084
	Onshore Civil Work										
	General										
	Mobilization/Demobilize (Prime)								350,000		350,000
	Construction Surveying & Staking								8,830		8,830
	Termination Structures (In Substation Estimates)										
	230 kV 3-Φ Termination Structures - GIS	2						40,000	40,000		80,000
	Foundation, Termination Structures - GIS	2						5,212	10,424		15,636
	Grounding/Bonding on Termination Structures	2						2,200	3,630		5,830

Pacific Gas and Electric Company

Job Estimate - Detail Sheet: Plant to be Installed

Order Number: 30605686

Embarcadero-Potrero 230kV Transmission Line
San Francisco

Removal Order or Asset No.	Description	Quantity	Provider Cost Center	Activity	Standard Rate	Hours	SUB-TOTAL AMOUNT (dollars only) Internal Services	Material	Contract	Other	TOTAL ($ only)
	Ductbank Transitions (Concrete Encased Bends)	2						6,679	36,658		43,337
	Splicing Vaults										
	Splicing Vaults, 24'x8'x8'	7						350,000	980,000		1,330,000
	Manhole Racking	7						35,420	73,500		108,920
	Vault Grounding	7						7,000	18,200		25,200
	Ductbank Installation										
	Utilility Locates 200/Mile								91,650		91,650
	Traffic Control								110,000		110,000
	Soil Erosion and Sediment Control							1,766	8,830		10,596
	Excavation (50ft/day)	6217 Cu Yd						155,417	1,865,000		2,020,417
	Concrete Encasement	1647 Cu Yd						242,097	247,038		489,135
	Concrete Reinforcement, Rebar (18 Long+Cross@ 5')	160,017 FT						200,021	960,102		1,160,123
	Backfill, FTB	2433 Cu Yd						287,955	182,496		470,451
	Road Bed Restoration, 1'-6" Crushed Rock	3108 Cu Yd						62,167	124,333		186,500
	Pavement Saw Cutting, Concrete	7460 LFT							113,765		113,765
	Pavement Removal, 11 feet wide	41,030 SQFT						86,163	410,300		496,463
	Pavement Restoration, Concrete, 11 feet wide	41,030 SQFT						315,521	310,187		625,708
	8" SCH. 40 PVC Conduit	14,920 LFT						111,900	223,800		335,700
	2" SCH. 40 PVC Conduit	3730 LFT						4,924	22,380		27,304
	4" SCH. 40 PVC Conduit	7460 LFT						23,126	74,600		97,726
	1.25" HDPE Conduit	22,380 LFT						24,842	67,140		91,982
	8" Conduit Spacers	2984 each						44,760	35,808		80,568
	4" Conduit Spacers	1492 each						17,904	17,904		35,808
	Dewater (100%)	3730 LFT							74,600		74,600
	Shoring (100%)	111,900 sqft						55,950	223,800		279,750
	HDD Installation										
	Horiz. Directional Drill	6000 LFT						360,000	4,200,000		4,560,000
	Conduit for Cables, 10" DR 11 HDPE	6000 LFT						240,000	180,000		420,000
	Cofferdam Construction	6						1,500,000	9,000,000		10,500,000
	Traffic Control	2							424,000		424,000
	Construction Management								5,400,000		5,400,000
	Subtotal Estimated Submarine Route Cost (prepared by B&V)							**30,039,597**	**43,340,873**		**73,380,470**
	Electro Magnetic Field (EMF) Reduction										
	4% of Total Project Costs									4,300,546	4,300,546
	Subtotal Electro Magnetic Field (EMF) Reduction									**4,300,546**	**4,300,546**
Total Order Cost (Excl ESCAL, CONTINGENCY, AFUDC, & OVERHEADS)						**15,996**	**2,394,289**	**30,039,597**	**49,495,654**	**21,549,561**	**103,479,101**