



*Pacific Gas and
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May 24, 2004

BY HAND DELIVERY

Docket Office
California Public Utilities Commission
505 Van Ness Avenue, Room 2001
San Francisco, CA 94102

Re: **A.03-12-039**
***Application of Pacific Gas and Electric Company, a California corporation, for a
Permit To Construct the Potrero to Hunters Point 115 kV Cable Project Pursuant to
General Order 131-D (U 39 E)***

Dear Docket Clerk:

Enclosed for filing in the referenced proceeding is an original and seven (7) copies of *Pacific Gas And Electric Company's Reply To Protest Of The City And County Of San Francisco To The Application Of Pacific Gas And Electric Company For A Permit To Construct The Potrero To Hunters Point 115 kV Cable Project*.

Please return an endorsed filed copy in the stamped, self-addressed envelope provided for this purpose. Thank you.

Very truly yours,

/s/

David T. Kraska

DTK:gmj

cc: Sarah R. Thomas, ALJ
Geoffrey F. Brown, Commissioner
Kenneth Lewis, CPUC Energy Division
John Boccio, CPUC Energy Division
Regina Birdsell, Office of Ratepayer Advocates
Joseph P. Como, San Francisco City Attorney's Office
Parties on CPUC service lists A.03-12-039 and A.99-09-006

Enclosures

**BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA**

Application of PACIFIC GAS AND
ELECTRIC COMPANY, a California
corporation, for a Permit To Construct the
Potrero to Hunters Point 115 kV Cable Project
Pursuant to General Order 131-D

A.03-12-039

(U 39 E)

**PACIFIC GAS AND ELECTRIC COMPANY'S
REPLY TO PROTEST OF THE CITY AND COUNTY OF
SAN FRANCISCO TO THE APPLICATION OF PACIFIC
GAS AND ELECTRIC COMPANY FOR A PERMIT TO
CONSTRUCT THE POTRERO TO HUNTERS POINT 115
KV CABLE PROJECT**

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I. INTRODUCTION

Pursuant to Rule 44.6 of the California Public Utilities Commission's ("Commission" or "CPUC") Rules of Practice and Procedure and with the permission of Administrative Law Judge Sarah Thomas and Assistant Chief Administrative Law Judge Lynn Carew,¹ Pacific Gas and Electric Company ("PG&E") hereby replies to the protest ("Protest") filed by the City and County of San Francisco ("CCSF") to PG&E's Application for a Permit To Construct ("PTC") the Potrero To Hunters Point 115 kV Cable Project. PG&E filed its Application on December 30, 2003, and formally noticed the project in early January in accordance with the CPUC's General Order ("GO") 131-D. The protest period ended February 9, 2004. Other than CCSF's late-filed protest, no requests for hearings, responses, or other protests have been filed in connection with this Application.

PG&E and the California Independent System Operator ("ISO"), which has already determined that the Project is needed and approved it for addition to the ISO-controlled grid, have an obligation to ensure reliable electric service in San Francisco and the northern San

¹ Telephone calls with Jo Lynn Lambert on May 7 and May 21, 2004. ALJ Thomas authorized filing the Reply on Friday, May 21, 2004; Assistant Chief Administrative Law Judge Carew granted a one-day extension.

Mateo County area, the areas to be served by this project. PG&E also has committed to the residents of San Francisco's Bayview/Hunters Point community that it will close the existing Hunters Point Power Plant as soon as the ISO agrees to terminate the plant's "Reliability – Must Run" contract, and that it will actively pursue the transmission upgrades needed to convince the ISO that the plant can be closed consistent with the ISO's obligation to maintain transmission system reliability.² The voluminous record in the Jefferson-Martin case demonstrates that, assuming the Jefferson-Martin and Potrero-Hunters Point projects are timely permitted by the Commission and constructed before the end of 2005, the transmission system in the project area will remain in compliance with all applicable ISO reliability criteria and the Hunters Point Power Plant can be closed. (*See, e.g.*, Jefferson-Martin 230 kV Transmission Project, A.02-04-043, Exhibit 4, at 1, 73-74.) Now, with its reckless demand for time-consuming reconsideration of a routing alternative that months of expert engineering investigation has already shown to be infeasible, albeit financially advantageous for the City, CCSF places both of these important goals at risk.

Unlike CCSF, PG&E must ensure that any specific project route it proposes to meet an ISO-identified need is feasible and can be constructed in time to meet the identified need. To that end, PG&E hired a recognized expert in transmission engineering³ to independently assess the feasibility of several potential routes for the Potrero-Hunters Point project, including the feasibility of utilizing the existing underwater crossing previously constructed by CCSF as part of its San Francisco Light Rail Project. Based on Black & Veatch's assessment as well as that of PG&E's own engineers, there can be no doubt that PG&E's proposed project route is feasible and can be completed on time to meet the ISO-identified need, assuming timely approval of the PTC application by this Commission. (Proponent's

² In 1998, CCSF and PG&E entered into an agreement to close Hunters Point Power Plant as soon as 1) it was no longer needed to sustain electric reliability in San Francisco and surrounding areas, and 2) the California Independent System Operator authorizes closure of the plant.

³ *See* Jefferson-Martin 230 kV Transmission Project, A.02-09-043, Exhibit 13, Attachment 3 (Lowell Rogers statement of qualifications) and Reporter's Transcript at 2275-76 (280 Citizens Witness Tassainer) (Black & Veatch is "the Cadillac of the engineering firms").

Environmental Assessment supporting PG&E's PTC Application ("PEA"), Chapters 1-2; Black & Veatch, Islais Creek Bore and Associated Facilities: Identified Deficiencies in Design and Construction Quality ("B&V Report," attached as Exhibit B), at 1.) The proposed project would be constructed almost entirely within existing streets using standard underground construction techniques of the sort used successfully in countless other utility construction projects. (PEA, Chapter 1.) CCSF's favored Islais Creek route, by contrast, would require PG&E, the ISO, and this Commission to gamble on the safety and long-term reliability of an underwater conduit that is currently flooded, was constructed by CCSF without following basic engineering practices such as backfilling the casing with grout to prevent intrusion of water, and was installed atop soils subject to liquefaction and other seismic problems (*see* part III.B below).

PG&E, again unlike CCSF, has no financial stake in which route is selected. Instead, PG&E strives to propose the lowest-cost route that is feasible, capable of being constructed on time to meet the identified need, and involves the fewest significant environmental impacts. The PEA included with the Application demonstrates that the proposed project will not result in any significant environmental effects after mitigation. This conclusion is further supported by the fact that not a single protest or request for hearings was filed by nearby landowners, businesses, or residents, much less federal or state resource agencies charged with protecting the environment. The lack of public or resource agency concern over potential project impacts should not be surprising in light of the extremely limited, all-underground nature of the project, as well as its nearly exclusive utilization of existing streets through already-developed industrial and commercial areas. It is no stretch to say that the Potrero-Hunters Point project involves, by a significant margin, the lowest level of environmental impact of any project permitted by the Commission under General Order 131-D.⁴ Thus, environmental issues provide no basis for a decision to consider alternative routes

⁴ To be sure, the CPUC has approved several projects of similar voltage that involved far *more* new construction, including overhead construction through both developed and undeveloped areas, based on Mitigated Negative Declarations that concluded the projects would result in no significant environmental effects. *See, e.g.*, Atlantic-Del Mar PTC Application, A.01-07-004, Final Mitigated Negative Declaration ("FMND") at A-3 (finding no significant environmental effects, and no alternatives analysis needed, for

for the Potrero-Hunters Point project or otherwise delay completion of the required Initial Study/Mitigated Negative Declaration and timely approval of the PTC Application. (See part III.F below and Guidelines for the Implementation of the California Environmental Quality Act (“Guidelines”), § 15102, requiring preparation of an Initial Study within 30 days after application is accepted as complete (here April 1, 2004) and § 15107, requiring completion of negative declaration within 180 days.)

While cost issues are beyond the scope of PTC Applications,⁵ cost, too, argues in favor of PG&E’s proposed route. The cost to ratepayers of PG&E’s proposed route would be less than the cost of CCSF’s favored Islais Creek route even if one optimistically assumes that the existing crossing can somehow be rehabilitated and that CCSF and the Port of San Francisco will accept PG&E’s assessment of the monetary value of the crossing and the rights of way necessary to install portions of the project across Port lands. (See part III.D below.) Should a new crossing be required (as appears likely based on Black & Veatch’s engineering analysis), or if CCSF or the Port demand more money for the privilege of utilizing their property (as appears likely based on the parties’ failure to agree on value to date), the additional cost to ratepayers associated with the Islais Creek route would be even greater.

CCSF’s stated belief that its route must cost less than other alternatives simply because it is slightly shorter in length conveniently overlooks the significant additional costs associated with the engineering, seismic, and land acquisition challenges noted above, and in any event is not supported by any actual cost estimates. Moreover, such conjecture must be viewed in light of the fact that CCSF has a direct financial interest in the results of this

project involving 4.1 miles of new overhead and underground lines through primarily industrial and residential land uses); North San Jose Capacity Project PTC Application, A.98-06-001, FMND at part 1, at 7; part 5, at 9 (finding no significant environmental effects, and no alternatives analysis needed, for project involving approximately 8 miles of new and secondary overhead lines through various urban land uses including light industrial, parks/open space, and residential).

⁵ See G.O. 131-D, Section IX.B.1.f; Atlantic-Del Mar Reinforcement Project, A.01-07-004, Assigned Commissioner’s Ruling dated October 16, 2002; CPUC Decision adopting GO 131-D, D.94-06-014 (“the permit to construct is meant strictly for environmental review, not economic or ‘needs’ review”).

proceeding. Routes for the Potrero-Hunters Point project that would require PG&E to acquire more right-of-way from the Port of San Francisco – such as the Islais Creek route – would naturally result in more money flowing into the City’s coffers in the form of negotiated or court-ordered payments from PG&E for the necessary land rights. More significantly, CCSF spent substantial amounts to construct an underwater crossing and other facilities to accommodate a series of transmission and distribution projects that it apparently no longer plans to construct, at least not in the near future. Making matters worse for CCSF, there are obvious and serious problems with those facilities that call into question whether they can ever be feasibly used for electric transmission by CCSF or anyone else. These proceedings should not be used to transfer CCSF’s fiscal obligations from the taxpayers of San Francisco to ratepayers throughout California – regardless of how much CCSF might want the Commission to take this white elephant off its hands.

Hoping to turn this into a case about PG&E rather than the merits of the project, CCSF acts as though it had no idea that PG&E was considering routes other than the Islais Creek route and claims, incredibly, that it had no knowledge of PG&E’s plan to proceed with its Application. The evidence attached to this Reply paints a very different picture, demonstrating with specific details the extent to which PG&E has kept CCSF informed of PG&E’s plans concerning this application. PG&E has been meeting with CCSF representatives since 2002 to discuss the option of proceeding with a joint project that, at the time, looked as if it might result in lower overall costs to ratepayers and still meet the schedules for completion of the project and the closure of Hunters Point Power Plant. However, contrary to the glib assurances in CCSF’s protest, the conduit installed by CCSF at Islais Creek has major problems, in part because it was not properly sealed after construction and is now flooded. PG&E retained outside engineering experts to evaluate the suitability of the creek crossing, but the experts found the condition of the crossing so questionable that there could be no assurances as to its feasibility for enclosing a major transmission line (much less two transmission lines as PG&E and CCSF had been discussing). Analysis included soil borings to determine soil profile characteristics and soil thermal properties.

CCSF has made no attempt to address PG&E's engineering consultant's concerns and has represented in meetings that any such resolution will be at PG&E's ratepayers' cost and at PG&E's risk. (Declaration of Robert Bonderud, attached hereto as Exhibit C, ("Bonderud decl."), ¶7.)

Given the technical uncertainties of the Islais Creek route, the amount of time required to develop and permit an alternative route, and the need to complete the project, however configured, before the end of 2005, PG&E—with CCSF's knowledge and professed understanding (*Id.* at ¶10)—proceeded on a parallel path to develop another route that was both feasible and cost-effective. This is the route PG&E filed as its proposed route in the PTC Application. As demonstrated in the PEA, the proposed all-underground route would avoid the need to construct in Islais Creek and would result in no significant environmental impacts. (Indeed, but for the fact that a small portion of the route leaves public roads and crosses a private parking lot, PG&E would not have needed to file a PTC application for this route and instead would have built the project under the Notice of Construction ("NOC") procedures set out in Sections III.B and XI.B of GO 131-D.) As further demonstrated in the PEA, the proposed route can be constructed by the end of 2005 or sooner, assuming the CPUC process does not get bogged down by CCSF's meritless claims. No resident, business, or other interested party has protested PG&E's proposed route, which further highlights the lack of any real need to delay this project pending completion of additional time-consuming proceedings before the CPUC.

In any event, the attached evidence verifies that PG&E discussed the proposed route with CCSF representatives, submitted letters requesting a position statement (including letters personally handed to CCSF's Islais Creek negotiating team⁶), and fully informed

⁶ PG&E representatives met with Ed Smeloff, Marla Jurosek, and Sandra Rovetti from CCSF's Hetch Hetchy Power and Water Department on September 16, 2003. During this meeting, they handed out copies of PG&E's letter requesting a position statement on PG&E's alternative routes. They requested that CCSF provide a position statement before the PTC application was filed, and explained that, if PG&E did not receive a position statement in response, PG&E would indicate in its application that no response was received. (Bonderud decl., ¶9.) The Acting Director of the Planning Department, Larry Badiner, later called PG&E after receiving the letter and stated that they would not be submitting a position statement. (*Id.* at ¶4.)

CCSF of the rationale behind filing the PTC application for the proposed route in order to keep the project on schedule. All this forewarning—and more—was provided over and above the official notice that was duly given to CCSF in accordance with CPUC rules. (*See* part III.E below.)

Significantly, CCSF's protest does not request evidentiary hearings or an EIR to explore environmental concerns. Rather, CCSF requests that the CPUC forego any environmental review, rely on its own determination that the project is categorically exempt from CEQA, and order PG&E to construct the project using the Islais Creek crossing, thereby forcing PG&E's ratepayers to pay for an underwater conduit that CCSF built, failed to maintain, and no longer needs.

While CCSF has no obligation to California ratepayers generally, and is therefore understandably more concerned about its own costs than those of the ratepayers, this Commission does not have the same luxury. Likewise, while CCSF does not have an obligation to provide reliable electric service to the northern Peninsula area, and can therefore afford to hope that PG&E can somehow find a way to overcome the myriad obstacles to timely completion of the Islais Creek route, PG&E, the ISO, and this Commission do not have that luxury, either. PG&E has proposed the only route that is known to be feasible, can be constructed and operational before the end of 2005 (assuming timely issuance of the PTC), results in no significant environmental effects after mitigation, and imposes the lowest overall cost to ratepayers. PG&E respectfully requests that the CPUC reject CCSF's protest and return with all possible speed to the CEQA process to ensure that this project is constructed in 2005. The minor environmental concerns raised by CCSF with the proposed route (which are routine issues *equally applicable to the Islais Creek route*⁷) will be fully examined and addressed by the Energy Division as part of its CEQA review of the project. Thus, none of the grounds stated in the Protest justify denial of the PTC application or raise any issues that would indicate a need for an EIR or evidentiary

⁷ *See* part III.A below. In fact, the Islais Creek route presents greater seismic concerns than PG&E's preferred route or any of the other potential routes. (B&V Report, at 3.)

hearings on PG&E's application. That application was filed *nearly five months ago* yet has sat dormant ever since. This Commission must move forward.

II. BACKGROUND

PG&E owns and operates a 115 kilovolt ("kV") underground electric cable system consisting of 13 cables in the City and County of San Francisco. PG&E proposes to reinforce the system by installing a single-circuit, 115 kV power line between the Potrero and Hunters Point switchyards. (PEA, Chapter 2.)

For several years, PG&E and CCSF have been exploring the possibility of building joint facilities that would meet their respective needs and offer cost savings to PG&E ratepayers and CCSF residents. (Bonderud decl., ¶7.) Although discussions were ongoing, no agreement was ever reached on a specific plan for such an endeavor. (*Id.*) Nevertheless, entirely on its own, CCSF proceeded to bore and install a bore casing containing conduit under Islais Creek as part of its San Francisco Light Rail Project. (*Id.*) The bore casing was not filled with thermal grout, the ends of the casing and conduits were apparently left unsealed, and the casing and conduits were soon flooded with water from San Francisco Bay. (Declaration of Lowell Rogers ("Rogers decl."), Exhibit A, at ¶4.) PG&E's experts believe that the bore casing may also have lost its circular shape due to soil pressure on the ungrouted line, which would make it difficult or impossible to install adequate grout, or PG&E's electric lines. (Rogers decl., ¶5.) When these and other issues surfaced (*see* PEA, at 2-6 and part III.B below), and CCSF was unwilling to address them, PG&E turned to other alternatives in order to meet escalating power needs as well as its obligation to close the Hunters Point Power Plant. (Bonderud decl., ¶7.)

CCSF separately installed approximately 1400 feet of conduit in Illinois Street. (PEA, at 2-6.) Although CCSF repeatedly states that "much" of the Islais Creek route is already constructed, this conduit and the Islais Creek crossing together amount to only a fraction of the total 1.9-mile route that PG&E would need to construct under the plan promoted by CCSF.

The alternate route that PG&E engineers have developed, as proposed in PG&E's Application, is an entirely underground 115 kV single-circuit power line between the Potrero Switchyard and the Hunters Point Switchyard. (PEA, Chapter 2.) The line, approximately 2.5 miles in length, is almost entirely in city streets and will have no significant environmental impacts. (PEA, Chapter 3.) Because it avoids the Islais Creek crossing, this solution involves none of the uncertainties that plague the route advocated by CCSF.

The Potrero to Hunters Point 115 kV Cable Project is of crucial importance to the ISO, CCSF residents, and other interested stakeholders. PG&E's transmission planning study results, which were developed in conjunction with the ISO, CCSF, the CPUC, and other stakeholders, indicate that this project is needed in order to provide safe and reliable power to San Francisco and northern San Mateo County customers. In addition, the project will provide a critical component needed to close PG&E's Hunters Point Power Plant pursuant to PG&E's agreement with the City. PG&E's proposed project—unlike the Islais Creek alternative—can dependably meet these needs.

III. REPLY TO PROTEST

A. The Route Proposed By PG&E Can Be Built and Can Be Built On Schedule

The PEA submitted with PG&E's Application examines all possible environmental impacts of the proposed project. Chapters 4 through 14 of the PEA demonstrate how all project impacts are either less than significant, or can be avoided or reduced to less than significant levels through implementation of PG&E's proposed avoidance and mitigation measures.

The PEA also indicates that the project can be completed by December 2005 at the latest, assuming the permitting process is completed by the end of this year.⁸ (See PEA, at 1-

⁸ This was a reasonable assumption. Never has the CPUC actually held evidentiary hearings or prepared a full EIR for a PTC-level transmission project filed by PG&E, much less a PTC-level project proposed to be located entirely underground in mostly industrial and commercial areas. (See, e.g., North San Jose Capacity Project, D.99-08-023; Atlantic-Del Mar Reinforcement Project, D.03-02-007.) Nor has filing of a protest demanding consideration of alternative routes ever led the Commission to halt work on its Initial Study or

20; Application, Exhibit B (Project Schedule).) As indicated in the Project Schedule, construction could begin as early as September of 2004, if permitting were completed. The PEA assumes a construction schedule of approximately 9 months for the proposed route. (PEA, at 1-20.)

Although CCSF points out that PG&E's preferred route is subject to seismic shock and may contain hazardous materials, those issues are common to all routes, *including the Islais Creek route*. In fact, the Islais Creek route has greater potential seismic impacts than the preferred route or any other route studied. (*See* part III.B below.) Perhaps CCSF was unaware of these potential impacts because, unlike PG&E, CCSF prepared no geotechnical report as part of its environmental review of the Islais Creek project. (Exhibit A to CCSF Protest, at 3.)

The presence of hazardous materials is routine in San Francisco's city streets, especially in industrial areas like this one. Standard measures are available to deal with known or discovered hazardous materials, *as noted in CCSF's own environmental materials*. (*Id.*) PG&E's PEA lists the routine measures that will be taken to deal with the hazardous materials that are known to exist in one portion of the route, and that could be discovered elsewhere. (PEA, Chapter 9, at 9-13 – 9-14.) As one would expect based on the Commission's own past evaluation of the environmental effects of hazardous materials encountered during underground trenching projects, no significant impacts will result.²

The only other argument CCSF offers against PG&E's preferred route is that the project may need to be built during the City's street excavation moratorium on 23rd Street. However, although PG&E must and will obtain ministerial permits from CCSF as required

require resolution of issues raised in the protest before commencing or completing CEQA review. (*See, e.g.*, San Mateo-Martin No. 60 kV Conversion Project, D.03-10-018; Atlantic-Del Mar Reinforcement Project, D.03-02-007 (in which the CPUC rejected the City of Rocklin's demand for hearings on alternate routes where PG&E agreed to mitigation for its proposed route – undergrounding – that would reduce all impacts to less-than-significant levels); Tri-Valley Capacity Increase Project, D.01-10-029; Jefferson-Martin 230 kV Transmission Project (pending), A.02-09-043.)

² Indeed, the CPUC's Final Environmental Impact Report ("FEIR") for the Jefferson-Martin 230 kV Transmission Project concluded that no significant impact would result even with installation of an underground 230 kV line through a DTSC-regulated, capped hazardous waste landfill. (FEIR, at D.8-36.)

by GO 131-D, CCSF has no discretionary authority that would allow it to stop a project under CPUC jurisdiction. (*See, e.g.,* Public Utilities Code, § 1007.5.) The Commission has acknowledged this reality in numerous EIRs for transmission projects. (*See, e.g.,* Jefferson-Martin 230 kV Transmission Project, A.02-09-043, FEIR, at A-10; Northeast San Jose Transmission Reinforcement Project, A.98-06-001, DEIR, at C.7-11.) And, as CCSF acknowledges, emergency waivers are available under local law in any event. Moreover, especially given the delays already caused by CCSF's Protest, the 300-foot portion of the line along 23rd Street is likely to be constructed after June 2, 2005, when the moratorium ends.

B. The Islais Creek Crossing's Questionable Feasibility Renders it Too Risky as a Route Option

As stated above, experts hired by PG&E have evaluated the conduit installed under Islais Creek and raised serious questions about the feasibility of this route. (*See generally* B&V Report, attached as Exhibit B, and Rogers decl., attached as Exhibit A.)

First, because the ends of the conduit were not properly sealed after construction, the bore casing and conduits have become inundated with bay water, which has likely deposited sediment or other debris. As a result, the bore may not have the minimum thermal requirements needed for a high voltage underground transmission line. (Rogers decl., ¶4.)

Second, the casing may now be flattened, or egg-shaped, due to soil pressure because the bore casing was not filled with thermal grout shortly after installation. If this deformation is to the extent expected, and new conduit needs to be installed, the shape of the casing could prevent the installation of a new conduit package in the configuration required for this project. Further study to assess the condition of the duct bank, and attendant delays, would be required and the bore may have to be completely reconstructed in order to follow this route. (*Id.* at ¶5.) Moreover, there is some question as to whether the bore can be reconstructed. (*Id.* at ¶6.)

Third, underlying layers of soils at Islais Creek have been found to be susceptible to liquefaction. Geotechnical reports indicate the area near the Islais Creek waterfront is susceptible to lateral spreading where potential deformations could be as much as five feet of

lateral movement accompanied by a downward movement of almost equal amount. (*Id.* at ¶7.) This condition is not present on the other routes that PG&E has considered. (*Id.*)

Fourth, the CCSF-installed vaults are founded directly on existing soils. For this reason, the duct bank may separate at the vault if the soils are subject to settlement and/or heaving, or during a seismic event. Substantial, continuing subsidence is already apparent near Islais Creek that would threaten conduit stability. For this and other reasons, new vaults would need to be installed. (*Id.* at ¶8.)

Fifth, the Port of San Francisco has plans to construct a railroad over the existing ducts installed by the City and County of San Francisco. In order to withstand this additional loading, the duct banks may need costly foundation rework, including pile driving. The railroad may also limit maintenance access during railroad operation. (*Id.* at ¶9.)

Finally, a further complication is whether the City would have sufficient capacity on its contemplated second power line if it is installed in the same duct bank that crosses Islais Creek. PG&E engineers have determined that the minimum ampacity needed on the proposed line is 200 megavolts-ampere (“MVA”). Calculations show that the existing conduit, if it is even usable,¹⁰ would be adequate for PG&E’s needs but would have little excess capacity – at best, enough for a lightly-loaded distribution circuit. (Rogers decl., ¶ 4; B&V Report, at 2.) That amount of capacity would not allow CCSF to meet its goals for the original joint project, as those goals were described to PG&E (Bonderud decl., ¶7). As such, the Islais Creek route presents utility planning conflicts that render this option infeasible using the existing conduit.

Even if it is possible to remove and replace the existing conduit and deal with all other feasibility issues with the Islais Creek crossing, the crossing would still have ampacity limits. With PG&E’s line installed (with a minimum 200 MVA) in new conduits, the capacity of the CCSF line would be limited to less than 116 MVA, which may not be

¹⁰ The space inside of the casing and between the conduits would need to be filled with bentonite/sand slurry. There is a significant risk of collapsing the conduits during this process, which would render them unusable. (B&V Report, at 2.)

sufficient for the City's needs. (Rogers decl., ¶4.) CCSF has yet to resolve this issue. (B&V Report, at 2.)

Unfortunately, there is no way to evaluate and eliminate all of these concerns and establish that the conduit could be safely and economically utilized without actually starting the rehabilitation work itself, which would not only require a PTC, but would also cost a great deal of money that would be lost if any of the concerns are validated. (*See* Rogers decl., ¶10.) PG&E would be irresponsible to devote ratepayer resources to such an endeavor, particularly where, as here, there is another route that is known to be feasible, is capable of being completed on time, would result in no significant environmental impacts, and is less expensive. Proceeding with the Islais Creek route is a risky proposition—one with potentially enormous additional and unnecessary costs, both in time and ratepayer money.

C. Even if the Islais Creek Alternative Were Feasible, Nearby Construction Could Prevent Timely Project Completion

PG&E's PEA notes that the Port of San Francisco will construct the Illinois Street Intermodal Bridge over Islais Creek beginning in 2004, which could conflict with construction of PG&E's Islais Creek alternative. (PEA, at 2-6.) PG&E has been informed that the Port's construction schedule for this project begins in July 2004 and ends in December 2005. The bridge is immediately adjacent to the Islais Creek conduit crossing, and the Port will be using the surface area over the conduit for its lay-down areas. (Bonderud decl., ¶13.) Not only would PG&E likely be precluded from construction activities at either end of the conduit, PG&E could also be precluded from doing further investigation and testing on the conduit's feasibility. (*Id.*) The Port's project presents a major impediment to constructing the Islais Creek alternative by the end of 2005.

D. PG&E'S Preferred Route Is the Least-Costly Alternative

The estimated costs for PG&E's proposed route, excluding station costs,¹¹ are approximately \$26.6 million. Even assuming the Islais Creek crossing could be rehabilitated,

¹¹ Station costs are identical for each route, and total approximately \$4.3 million. (Bonderud decl., ¶12.)

estimated costs for the Islais Creek route would be a minimum of approximately \$26.8 million. This amount is based in part on the payments to CCSF for the Illinois Street facilities and shared Islais Creek crossing that have been proposed by PG&E, but of course those amounts have not been accepted by CCSF. (Bonderud decl., ¶12.) Although the estimated costs for the Islais Creek and PG&E’s proposed alternatives appear fairly close, that presents only part of the relevant cost analysis. For purposes of the above estimates, rehabilitation costs for the crossing are roughly estimated as \$500,000. (*Id.*) However, before rehabilitation can begin, permits would need to be acquired from the Port of San Francisco and other agencies, which could take several months. Rehabilitation itself would take another approximately six months. (Rogers decl., ¶10.) After all this time and expense, if the casing were found to be inadequate, PG&E would be compelled to replace the casing and create a new crossing – assuming that is even feasible.¹² (*Id.* at ¶¶5-6.) Constructing a new crossing would add another two years to the project construction schedule and up to \$4.5 million to project costs. (Bonderud decl., ¶12.) These cost and schedule risks would negatively impact ratepayers and jeopardize the San Francisco electrical reliability goals, as well as closure of the Hunters Point Power Plant.

E. PG&E Provided More Than Adequate Notice of the Application To CCSF

As required by the CPUC’s rules and GO 131-D, PG&E sent formal notice of the filing of the application to the City on January 2 and again on January 7, 2004. In fact, PG&E sent CCSF a total of *6 copies* of the project notice, with two additional copies to the Port of San Francisco Real Estate Department.¹³ Though not required by the CPUC’s rules, PG&E also sent the Acting Director of the Planning Department a complete copy of the Application and the Proponent’s Environmental Assessment (“PEA”). (Bonderud decl., ¶5.)

¹² The Port of San Francisco has indicated that there may be insufficient space for another bore in this general location (Bonderud decl., ¶13), and is expected to oppose any additional bore. (Rogers decl., ¶ 6; B&V Report, at 4.)

¹³ Copies of the notice and revised notice, with cover letters, were sent to the CCSF Board of Supervisors, the Planning Commission, and the Acting Director of the Planning Department. Copies were also sent to the Port of San Francisco Real Estate Department. (Bonderud decl., ¶¶5-6.)

As admitted in the City's protest, PG&E also submitted a written request for a position statement from the City, again as required by GO 131-D. (*Id.* at ¶3.) PG&E specifically explained that it was doing so to the CCSF negotiating team working on the Islais Creek joint project proposal. (*Id.* at ¶9.) Members of the negotiating team, including Ed Smeloff, Marla Jurosek, and Sandra Rovetti, were personally handed copies of the letter requesting the City's position at a meeting on September 16, 2003. (*Id.*) On November 10, 2003, PG&E informed the CCSF negotiating team—including Ed Smeloff, Sandra Rovetti, Angel Camerino, and Jacqueline Minor (a Deputy City Attorney)—that PG&E was planning to file a PTC Application on the proposed route the following month in order to complete the project by December 2005. (*Id.* at ¶10.) PG&E's attorney further left a voicemail for CCSF's lead attorney for transmission siting, Joe Como, providing a status update as to the filing before the expiration of the protest period. (*Id.* at ¶10.) The status of the Potrero-Hunters Point application was also the subject of testimony during the Jefferson-Martin hearings in January 2004, at which Mr. Como represented CCSF. (*See* Jefferson-Martin 230 kV Transmission Project, A. 02-09-043, Reporters' Transcript at 1006-1020.) In light of these facts, CCSF's claim that PG&E kept relevant members of CCSF staff in the dark is disturbing. (*See* CCSF Protest at 2, n. 3.)

F. CEQA Requires the CPUC To Immediately Prepare Its Initial Study On PG&E's Proposed Project

Section 15102 of the CEQA Guidelines requires a Lead Agency to determine whether it intends to prepare an EIR or a negative declaration within 30 days after accepting an application as complete, providing for a 15-day extension of that time limit with the applicant's agreement. (Guidelines, § 15102.) The Initial Study assists the Lead Agency in reaching this decision, and provides documentation of the factual basis for a finding that the project will have no significant impacts. (Guidelines, § 15063, subd. (a) and (c).) Since PG&E's PTC Application was deemed complete by the CPUC on April 1, 2004 (Bonderud decl., ¶14), the CEQA process is already behind schedule. PG&E understands that there were delays in the contracting process beyond the control of the CPUC, but that the CPUC's

consultant is now ready and able to complete the CEQA process. A negative declaration must be completed within 180 days from the date the application is accepted as complete. (Guidelines, § 15107.)

As PG&E's PEA amply demonstrates, PG&E's proposed project would have no significant impacts (*see* part III.A above). Therefore, the CPUC cannot, by law, consider alternatives to the project; alternatives are a valid consideration only when a Lead Agency concludes that the proposed project would cause significant impacts that cannot be mitigated to less than significant levels. (*See* Guidelines, § 15126.6, subd. (a) and (f)(2)(A) (the "key question" is whether significant effects of the project would be avoided or substantially lessened by putting the project in another location).) The CPUC must proceed with the CEQA process *on the project that PG&E's has proposed*, exploring another alternative *only if a significant unavoidable impact is identified*. As one Commissioner put it:

It is only if the initial study identifies potentially significant adverse impacts on the environment that cannot be mitigated that an environmental impact report will be prepared and alternatives considered. (Atlantic-Del Mar Reinforcement Project, A.01-07-004, Assigned Commissioner's Ruling dated 10-16-02.)

And, again, in the North San Jose Capacity Project's Final Mitigated Negative Declaration:

Under CEQA, examination of alternatives to a project is not required unless a project would cause significant adverse environmental impacts that cannot be mitigated to less-than-significant levels. Thus, no consideration or analysis of alternatives is required in a Negative Declaration. (Part 5, at 9.)

The CPUC has repeatedly recognized this legal responsibility and followed proper legal procedures—even when a city has demanded evidentiary hearings and/or an EIR to explore other route alternatives.¹⁴

¹⁴ *See, e.g.*, Northeast San Jose Capacity Project, A.98-06-001 (CPUC denied City of San Jose's request for rehearing to explore alternative alignments for the project in D.99-12-024); Atlantic-Del Mar Reinforcement Project, A.01-07-004 (City of Rocklin's request for study of alternative routes denied when PG&E agreed to the mitigation of undergrounding a portion of the proposed line during CEQA process, thereby eliminating the only potentially-significant project impacts).

IV. CONCLUSION

CCSF residents should not be forced to contend with power outages or the postponed closure of Hunters Point Power Plant while CCSF delays a necessary transmission project for spurious reasons. Neither should California ratepayers be responsible for increased transmission costs when a technically feasible, environmentally sound, and less expensive alternative exists. For these reasons and the reasons stated above, PG&E requests that the Commission deny CCSF's protest, find that evidentiary hearings are unnecessary, and approve the proposed project with all possible speed.

Dated in San Francisco, California, this 24th day of May, 2004.

Respectfully Submitted,

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By: _____ /s/
JO LYNN LAMBERT

Attorneys for
PACIFIC GAS AND ELECTRIC COMPANY

EXHIBIT A

**BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA**

Application of PACIFIC GAS AND
ELECTRIC COMPANY, a California
corporation, for a Permit To Construct the
Potrero to Hunters Point 115 kV Cable
Project Pursuant to General Order 131-D

(U 39 E)

Application No.

A.03-12-039

**DECLARATION OF LOWELL ROGERS
IN SUPPORT OF PACIFIC GAS AND ELECTRIC COMPANY'S REPLY TO PROTEST
OF THE CITY AND COUNTY OF SAN FRANCISCO TO THE APPLICATION OF
PACIFIC GAS AND ELECTRIC COMPANY FOR A PERMIT TO CONSTRUCT THE
POTRERO TO HUNTERS POINT 115 KV CABLE PROJECT**

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Attorneys for Applicant
PACIFIC GAS AND ELECTRIC COMPANY

Dated: May 21, 2004

I, Lowell Rogers, declare as follows:

1. I am a Project Engineer employed by Black & Veatch Corporation. My business address is Black & Veatch Corporation, 8950 Cal Center Drive, Suite 238, Sacramento, CA 95826.

2. I am a licensed civil engineer in the State of California, Lic. No. C 62437. I have been employed for over 5 years at Black & Veatch. My responsibilities have been to design underground and overhead electrical transmission facilities. I have experience working on the design, feasibility analysis, and cost estimating of electric underground transmission projects, including the Jefferson-Martin project, which will be one of the largest underground transmission line projects in the United States.

3. I have reviewed and examined design documents and attended meetings related to the potential use by Pacific Gas and Electric Company ("PG&E") for its Potrero-Hunters Point 115 kV Transmission Project of existing facilities installed by the City and County of San Francisco ("CCSF"), including conduit installed within a bore under Islais Creek. I have discussed these items with other experts employed by Black & Veatch and PG&E. My conclusions and concerns regarding the feasibility of using the CCSF-installed facilities are listed below.

4. Because the ends of the conduit were not properly sealed after construction, the bore casing and conduits have become inundated with San Francisco Bay water, which has likely deposited sediment or other debris. As a result, the bore may not have the minimum thermal requirements needed for a high voltage underground transmission line. By refurbishing the bore using a bentonite/sand slurry, it appears that 213 MVA (1071 A) could be achieved for a single circuit (one cable per phase) using 3500 kcmil XLPE insulated cable. Even though three conduits would remain open in the bore under these circumstances, a second, independent circuit would be severely limited in its load carrying capacity.

If CCSF requires a transmission line for its future use, new conduit will need to

be installed in the bore. Calculations indicate that, after this and other necessary remediation, assuming the bore can be successfully remediated, the bore could only accommodate PG&E's 200 MVA circuit with another circuit of 116 MVA or less. CCSF has yet to advise PG&E of the required capacity of its circuit.

5. The bore casing may now be deformed, due to pressure exerted on the casing by the outside soil pressure because the casing was not filled with thermal grout soon after installation. If this deformation is to the extent expected, it would prevent the remediation of the bore and the installation of a new conduit package in the configuration required for this project. Further study to assess the condition of the casing would be required and the bore may have to be completely reconstructed in order to follow this route.

6. There is some question as to whether reconstruction of the bore—that is, construction of a new bore in an adjacent location—would be possible given the space constraints in this location. I am informed that the Port of San Francisco is concerned about another bore impeding Port development. The Port has indicated that it would oppose an additional bore under Islais Creek.

7. Underlying layers of soils at Islais Creek have been found to be susceptible to liquefaction. Geotechnical reports indicate the area near the Islais Creek waterfront is susceptible to lateral spreading where potential deformations could be as much as five feet of lateral movement accompanied by a downward movement of almost equal amount. This is not present on the other routes that PG&E has considered for the Potrero-Hunters Point project.

8. The CCSF-installed vaults are founded directly on existing soils. For this reason, the duct bank may separate at the vault if the soils are subject to settlement and/or heaving, or during a seismic event. Substantial, continuing subsidence is already apparent near Islais Creek (as seen in stratified asphalt paving in the southern end of the bore and as noted in soil samples) that would threaten duct bank stability. In addition,

new vaults will need to be installed because the existing vaults at Islais creek will not be suitable for PG&E's use due to inadequate design for corrosion and grounding protection.

9. I am informed that the Port of San Francisco has plans to construct a railroad over the existing duct bank installed by the City and County of San Francisco. In order to withstand this additional loading, the duct bank may need costly foundation rework, including pile driving. The railroad may also limit maintenance access during railroad operation.

10. I know of no way to evaluate and eliminate all of these concerns and establish that the conduit could be safely and economically utilized by both PG&E and CCSF without actually starting the rehabilitation work itself. These tasks would take some 6 months to complete after permission is obtained from the Port of San Francisco and any other required agencies.

11. The basis for the foregoing conclusions are set forth in detail in *Islais Creek Bore and Associated Facilities, Identified Deficiencies in Design and Construction Quality*, a true and correct copy of which is included as Exhibit B to PG&E's Reply to CCSF's Protest.

12. I also reviewed and examined design documents and attended meetings concerning the technical feasibility of other potential routes for the Potrero-Hunters Point project, and made recommendations to PG&E concerning the feasibility of the various routes.

13. PG&E's proposed project avoids all of the problems and concerns discussed above with respect to the Islais Creek route, and is otherwise technically feasible utilizing standard, proven construction techniques.

EXHIBIT B

PACIFIC GAS & ELECTRIC COMPANY

**POTRERO – HUNTERS POINT
115 kV UNDERGROUND CABLE
PROJECT**

**Islais Creek Bore and Associated Facilities
Identified Deficiencies in Design and Construction Quality**

REV. 0: May 20, 2004

**Privileged & Confidential Document
Attorney-Client Communication / Attorney Work Product**

BLACK & VEATCH PROJECT # 134945.40.0000



BLACK & VEATCH
C o r p o r a t i o n

PACIFIC GAS AND ELECTRIC COMPANY

Potrero – Hunters Point 115 kV Underground Cable Project

Islais Creek Bore and Associated Facilities Identified Deficiencies in Design and Construction Quality

May 20, 2004

The Pacific Gas & Electric Company (PG&E) retained Black & Veatch (B&V) to prepare feasibility analyses of alternative transmission line routes for the Potrero – Hunters Point Transmission Project. Four different route alternatives, identified as Routes A, B, C and D, were evaluated based on construction feasibility, reliability, schedule, and cost. This circuit (AP-1) was evaluated in each of the route alternatives in a single circuit configuration.

The four routes are shown on the route map, Appendix A. Based on these analyses, the preferred route is Route D, followed by Route C. Routes A and B are the least preferred alternatives.

Report Scope

The overall Potrero-Hunters Point Project will include transmission lines, substations, and modifications to the existing PG&E system in the area. However, only transmission line alternatives associated with the City and County of San Francisco (CCSF) designed and built facilities are discussed in this report. This report is based on the amount of data available at this time, which may be preliminary in nature. The CCSF facilities are located along the alternative route A¹. The route is described as:

ROUTE A: Follows Illinois Street, the Illinois Street alignment within the S.F. Port Commission property, crosses Islais Creek, follows Cargo Way, Jennings Street, and Evans Avenue. Total length is 1.9 miles. A bore has been partially installed under Islais Creek for a length of 0.2 miles by CCSF. An additional 0.25 miles of double circuit duct bank was installed by CCSF between 25th Street and Marin Street.

Islais Creek Bore Construction

The City and County of San Francisco Municipal Railway installed a bore crossing below Islais Creek, identified as "Bore No. 3" (Appendix D), which would be available for use by PG&E as part of route alternative A. The bore was installed during summer of 2003 utilizing horizontal directional drilling methods. This bore is approximately 722 feet long and 75 feet deep, and consists of a conduit package of eight (8) 6-inch schedule 40 PVC conduits and two (2) 2-inch schedule 40 conduits arranged within a 36-inch diameter HDPE casing pipe. The conduits are supported inside the casing by spider-type double-walled bore spacers located on 5-foot centers, maintaining approximate minimum spacing of 7.75 inches between conduits.

¹ A complete account of the Project alternatives and evaluations can be found in the *PG&E Potrero to Hunters Point 115 kV Cable Project, Proponent's Environmental Assessment*. December 2003.



The HDD was reamed to a diameter of 54 inches to pull the 36 inch HPDE casing pipe through. The annular space between the casing pipe and native soil was filled by means of injection grouting.

The annular space between the conduits and the inside of the 36-inch casing pipe has not been filled with thermal grout. It is our understanding that the ends of the casing pipe were left open to the environment and was allowed to flood with murky water from the Bay. It is likely that soil was transported into the casing pipe and has settled to the deepest portion of the bore. It is our understanding that the ends of the bore were capped and the bore pits were filled and paved over in order to utilize the area as a staging yard for the current bridge construction project.

The critical location for the ampacity of the line is near the wood piling in the north side of bore No.3, in which the HDPE casing pipe was installed about 60 feet below the grade, as shown in drawing CL-12259 (Appendix D). The thermal environment around the cables, especially at the deepest locations, is critical to obtaining the calculated and required cable ampacity. The space between the conduits and the inside of the casing pipe should have been filled with thermal grout as soon as possible after completing the bore to insure the inside of the casing is not contaminated with foreign materials and soil. To utilize this bore reliably and to its full capacity, the volume between the conduits and the casing pipe should be cleaned thoroughly and completely filled with an appropriate thermal grout. This may require removing the conduit package that is currently installed, cleaning the inside of the casing pipe, reinstalling the conduit package, and completing the grouting process.

Potrero-Hunters Point Ampacity Requirement

The proposed Potrero-Hunters Point underground line is required to have a minimum normal continuous rating of 200 MVA. Given the current status of the Islais Creek Bore #3, the least cost and most certain course of action would be to fill the annular space between the conduits and the inside of the casing with a bentonite/sand slurry. The ideal mix proportion by weight is around 70-80% sand, 20-30% bentonite with as much water as needed to pump the slurry into place. For this installation, the ability to pump the slurry into place will govern the mix design. It is recommended that a grout supplier be consulted to develop an acceptable grout mixture. The conduits are at risk of collapsing during the grouting process if the conduit internal pressure cannot be kept at levels sufficient to counter the pressure on the outside of the conduits during grouting. Since the slurry needs to be pumped a considerable distance up in elevation, there is a real risk of collapsing these conduits; which would require the conduit package to be removed and re-installed.

By taking no other action to refurbish the bore other than using the bentonite/sand slurry, 213 MVA (1071 A) can be achieved for single circuit (one cable per phase), by using 3500 kcmil XLPE insulated cable (Appendix B). Even though three conduits will remain open in the bore, a second, independent circuit would be severely limited in its carrying capacity. For a double circuit (two cables per phase), 335 MVA (1684 A) can be achieved. However, the double circuit configuration will utilize all available conduits of the bore. This double circuit option will require a Y-splice on either end of the bore to facilitate the transition from one to two cables per phase. This Y-splice is not a standard component for PG&E and has not been widely used in the industry. A special splice vault will be required to house this Y-splice. Refer to appendix C for more details about this splice. It is assumed that both the native bay mud and slurry inside the casing have a thermal resistivity of 125 C-cm/W.

If CCSF requires a line for its future use, calculations indicate that, after remediation, the bore can accommodate PG&E's 200 MVA circuit with another circuit of less capacity. CCSF has yet to advise PG&E of the required capacity of their circuit. The remediation of the bore will require that the existing conduit package be removed, the casing cleaned, a new conduit package installed,



and an acceptable thermal grout be installed². It is expected that the rehabilitation of the bore, if possible, will take eight months or more to complete.

The original construction process of the bore may have introduced defects that may prevent the rehabilitation of the bore. Of most concern is the possibility that the casing has deformed since the time construction was halted. Calculations indicate that the acceptable deflection limit of 5% was likely exceeded due to the bore being void of water for more than 100 hours (the actual duration is unknown). This deflection is caused by the differential forces acting on the casing because of the lack of opposing hydrostatic pressure that would have been present if the casing had been full of water.

Geological Conditions

Geologic conditions were evaluated based on information provided to B&V from PG&E. Design level geotechnical investigations and analysis must be obtained, and appropriate engineering and construction measures must be followed to minimize impacts to existing geology and assure proper performance of cable system and structures for the site specific soil conditions.

The project is located in a seismically active zone which has the potential to cause strong ground shaking, liquefaction, lateral spreading and lurching, land sliding, and seismic densification or settlement. Due to the variable nature of the artificial fills, generalized liquefaction is not expected to occur for the majority of all routes. However, only underlying layers of soils at Islais Creek have been found to be susceptible to liquefaction. Geotechnical reports indicate the area near the Islais Creek waterfront is susceptible to lateral spreading where potential deformations could be as much as 5 feet of lateral movement accompanied by a downward movement of almost equal amount (PG&E, referencing Woodward-Clyde, 1976). Localized slope failures could also occur along the creek channel. These geotechnical problems have not been identified along PG&E's preferred route, alternative D.

With design level geotechnical evaluations and proper engineering and construction, the geotechnical conditions along all routes do not inhibit the feasibility of any particular route, except Route A. Route A, crossing Islais Creek, presents hazards greater than the other routes due to the potential effects of lateral spreading and liquefaction.

Splice Vaults

The CCSF installed vaults are designed for 115 kV cable splices, have interior dimensions of 22 feet by 10 feet by 8 feet 6 inches tall, and include embedded and anchored unistruts on two-foot centers on each wall to support a racking system. All metal components are grounded utilizing 1/0 AWG. Pulling irons are designed for 40,000 pounds tension maximum. Each vault can contain up to six underground cable splices, three on each side wall. Vaults are designed for H20 traffic loading.

Each vault has a total of eight 6-inch conduits entering them. This allows up to six cables to enter a vault with two spare conduits. If two electrically separate circuits (PG&E circuit and a second CCSF circuit) are required, both electrical circuits should not be placed in the same vault due to operation/maintenance and safety concerns. If all six cables are electrically the same circuit, one vault for six cable splices is acceptable.

The existing vaults at Islais creek are not suitable for PG&E's use since there is no grounding built into the vaults. The vaults were also not designed to be exposed to a corrosive environment, such as salt water. It is expected that these splice vaults will be exposed and flooded with salt water. It is normal practice that the concrete coverage of the rebar with concrete be greater than

² *Evaluation Plan for the Islais Creek Bore #3*, Black & Veatch Technical Memorandum, March 25, 2004.



usual and to use a type 5 concrete mix which is less porous than a standard mix. These protective measures were not taken and a shorter lifespan and higher maintenance costs can be expected for these vaults.

The soils may be susceptible to settlement and/or heaving. The vaults are founded directly on existing soils and may be vulnerable if the soils are susceptible to movement. If not found to be reliably stable, modifications to the vaults and/or bore may be required (i.e. install pilings under vault, reinforce soils around unstable portions of the bore). It is not apparent that the CCSF design incorporated features that would protect the facility against a seismic event.

The conduit approaches to the vaults include an "expansion sleeve" which consists of a larger diameter plastic pipe embedded in the vault and extending 5 feet from the endwalls in which the smaller conduit is placed. The 6-inch conduit is set inside an 8-inch sleeve, which may allow up to 0.4-inches of vertical movement between the vault and the duct bank conduits. There is no reinforcing steel (drawing CL-12269, appendix D) at the vault/duct bank interfaces that would help prevent failure of the duct bank if differential settling occurs. Near the southern vault, recent and continuing subsidence is evident in the stratified asphalt paving (more than 12 inches thick) and as noted in soil samples. The duct bank may separate at the vault if the soils are susceptible to settlement and/or heaving, or during a seismic event.

During installation of the bore, soils exhibiting collapsing/caving and heaving were encountered. The geotechnical characteristics of the area should be further evaluated as part of the feasible and reliable use of the bore crossing. Stability of the bore itself, and stability of the vaults located on either side of the bore is not certain and further puts the feasibility of using this bore into question.

Future Heavy Rail Crossing

On the north end of the bore, the Port of San Francisco plans to install a heavy rail line that will cross the duct bank (note 9, drawing CL-12255, Appendix D). The duct bank was reinforced, but there are questions about its ability to withstand settlement or surface loading from the heavy rail. To withstand these loads, the duct bank may need costly foundation rework, including pile driving. The railroad may also limit maintenance access during railroad operation.

Permitting

Before any excavation or analysis of the condition of the bore casing, a special use permit, as well as a Right of Entry permit will be needed from the Port's Real Estate Department. During our application for entry to conduct geotechnical studies, the Port delayed granting the permit until it was explained that the work being done was not to install a new bore under Islais Creek. The Port can be expected to oppose the installation of a new bore.

In order to complete the duct bank or to refurbish the bore, local or regional construction permits, including a SWPPP, RWQB, BCDC, etc., will be required before construction. It is also possible that the area may be contaminated by hazardous materials.

Another conflict with the schedule is the ongoing construction of the bridge as well as likely delays in obtaining permissions from the Port to do any construction/investigation.

It is likely that the permitting requirements specific to the Islais Creek crossing and conflicts with the current bridge construction project will delay the Potrero – Hunters Point schedule and prevent it from being completed by the end of 2005.



APPENDIX LIST

Appendix A Alternative Routes Map

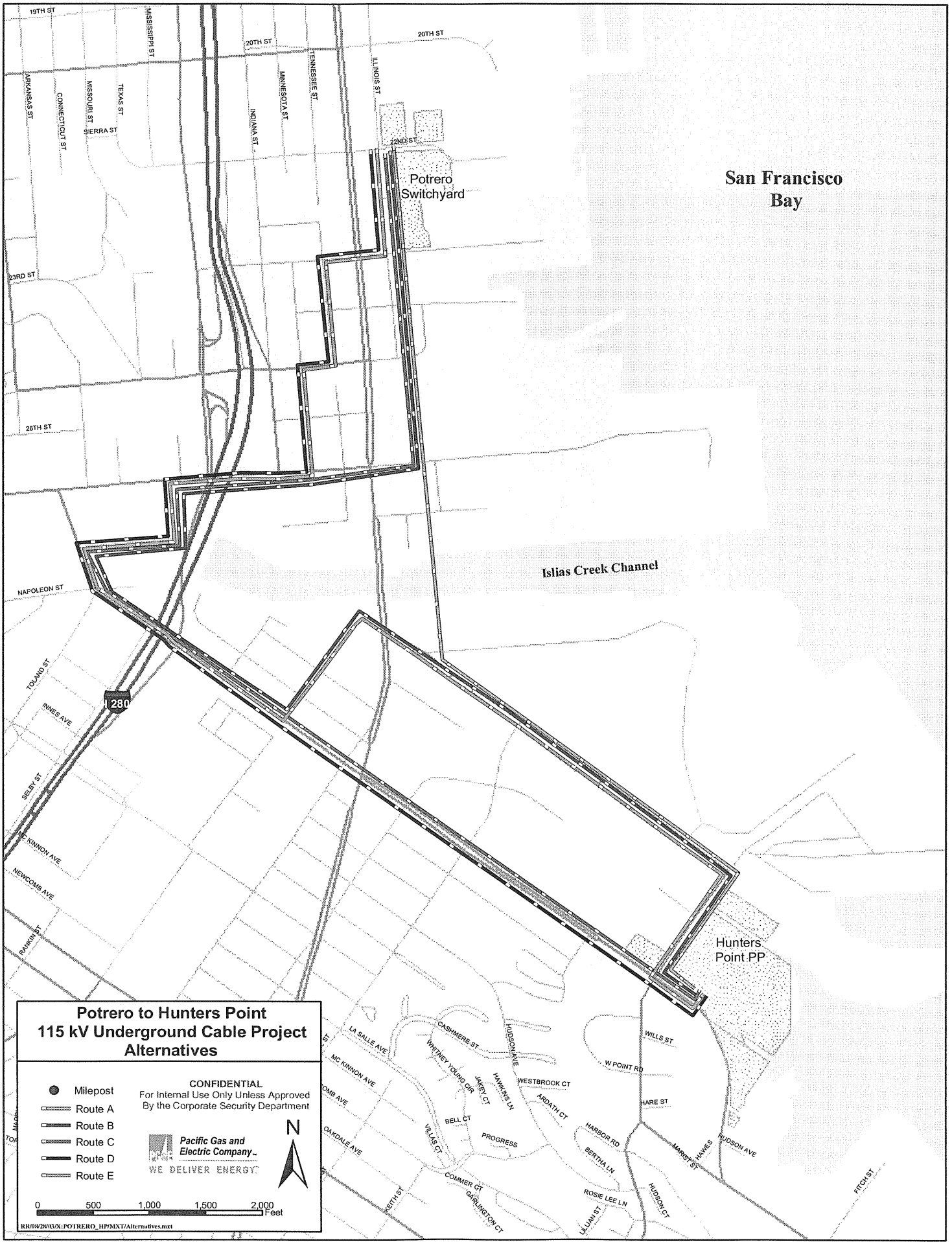
Appendix B Ampacity Calculations

Appendix C Y Branch Type Joint

Appendix D Islais Creek Bore

Appendix A

Alternative Routes Map



San Francisco Bay

Potrero Switchyard

Islia Creek Channel

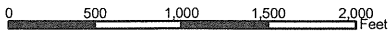
Hunters Point PP

**Potrero to Hunters Point
115 kV Underground Cable Project
Alternatives**

CONFIDENTIAL
For Internal Use Only Unless Approved
By the Corporate Security Department



- Milepost
- ▬ Route A
- ▬ Route B
- ▬ Route C
- ▬ Route D
- ▬ Route E



Appendix B

Ampacity Calculations

Ampacity Calculation for PG&E Potrero/Hunters Point Project

- Route A: 36" Casing (Islais Creek Crossing with One & Two Circuits)

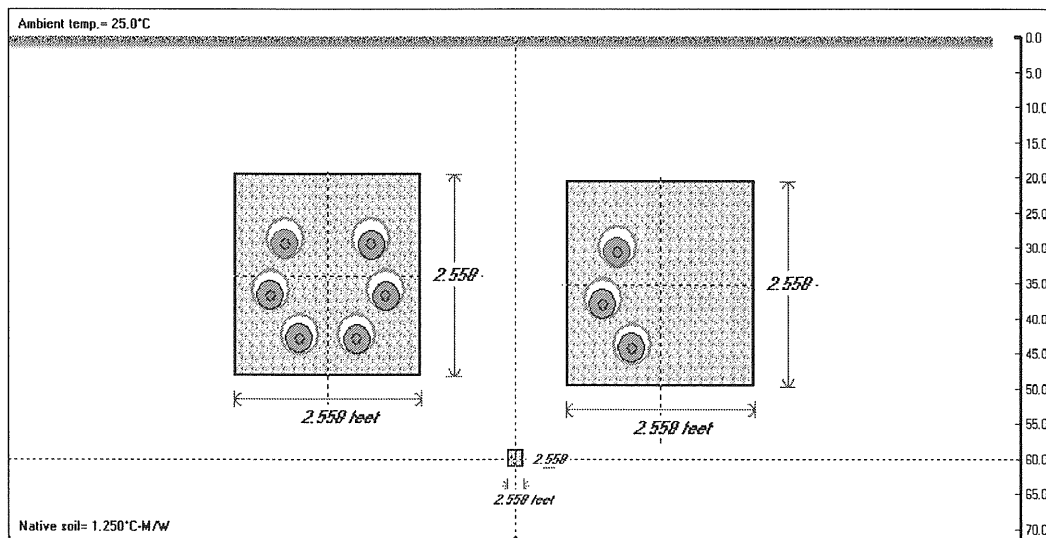
Owner PG&E
 Project Potrero/Hunters Point 115kV UG T-Line
 Project No. 134945.0150
 Title AMPACITY CALCULATIONS
BLACK & VEATCH

Computed By Forest L. Rong
 Date 18-Dec-03
 Checked By
 Date
Study: 115kV Potrero to Hunters Point

Type: (with different burial depth to the center of Casing)	Calculated Circuit Continuous Ampacity (A) 90 deg C	Calculated 72 hours Emergency Ampacity (A) 105 deg C	RHO VALUE C-cm/W of native soil	RHO VALUE C-cm/W of grout inside casing	Execution Title: (For record only)
Casing (two circuits)			125	125	
40'	873	1166			casing (2)
45'	864	1165			casing (2)
50'	855	1165			casing (2)
55'	848	1164			casing (2)
60'	842	1164			casing (2)
Casing (one circuit)			125	125	
40'	1103	1340			casing (1)
45'	1094	1339			casing (1)
50'	1086	1338			casing (1)
55'	1079	1338			casing (1)
60'	1071	1338			casing (1)

General Note :

- * 115kV 3500kcmil segmental copper conductor, 800 mils XLPE insulated cable.
- * Two circuits (6 cables) & one circuit (3 cables) scenario were assumed within the 36" (30.7" I.D.) HDPE casing.
- * 80% daily load factor was used to calculate the steady state continuous rating.
- * 25 deg C was assumed as soil ambient temperature.
- * Single point bonding system was assumed for cable sheath grounding.
- * Calculated ampacity is for one circuit, including three (3) cables.
- * 10% derating on ampacity has been considered for HDPE casing.



Appendix C

Y Branch Type Joint

154kV Y分岐接続部

電力技術開発センター 新延 洋*1・足立 宇弘*2・金子 智*3
株式会社ビスキャス 後藤 伸一・光山 安一
古河電気工業株式会社 山下 泰浩・田中 悟

154kV Y Branch Type Joint

H. Niinobe, T. Adachi, S. Kaneko, S. Goto, Y. Mitsuyama
Y. Yamashita & S. Tanaka

地中送電系統のCV化にともない、既設OFケーブル線路への π 引き込みなどに、CV/OF兼用のY分岐接続部（以下YJ）の適用が多くなると考えられる。しかし、従来型のYJでは、その大きさ、質量からYJ用としての専用設置スペースを必要とするため、既設マンホール内へ設置する場合には接続作業、ケーブルオフセット長などを考慮したコンパクト化が必要である。そこで、既設マンホール内スペースで接続・設置が可能なCV/OF兼用の154kV用異種YJ（長さ1,560mm、高さ585mm、幅305mm）を開発した。

Y branch type joint (henceforth, YJ) of XLPE cable and OF cable combination is needed for Y branch connection on the established OF cable system etc. with conversion on XLPE cable on the underground transmission line. However, although the installation place of the exclusive use from the size and weight was required in former type YJ, miniaturization was needed when connection in the restrictions space within an established manhole, cable offset length, etc. were taken into consideration. Then, the 154kV Y branch joint (a length of 1,560mm, a height of 585mm, a width of 305mm) connectable in an established MH space was developed.

1. ま え が き

既設線路の有効利用、増設対応のために、既設のOFケーブル線路に π 引き込みでCVケーブルを接続するケースが今後増大するものと思われ、これに対応したY分岐接続部の開発が望まれている¹⁾。しかし、既設マンホールは、OFケーブル用接続部を組立・設置するスペースはあるが、66kVYJからスケールアップした154kVYJでは、その大きさ、質量から既設マンホール内での接続作業が難しい。そこで、既設マンホール内で接続作業ができて設置可能なコンパクトで、かつCV/OFケーブルに対応した異種YJを開発・実用化することにした。

YJの構造は、CVケーブルに対してはプレハブ構造とし、近年の154~500kVPJでの各部構成要素ごとの電気性能確認データ²⁾および設計電界³⁾など、これまでのプレハブ構造の研究開発をとおして得られた技術をもとに、エポキシユニットの絶縁厚低減、ゴムストレスコーンの縮小化

を行った。一方、OFケーブルに対しては、エポキシベルマウスを適用した電界遮へい構造とし、CV側の縮小化により、絶縁ネックとなったエポキシユニットとエポキシベルマウスの界面電界の低減を検討して設計電界内に納めた。

エポキシユニット内部電極とケーブル導体との接続にはマルチコンタクトを適用し、エポキシユニットの長さ寸法を縮小して、さらにコンタクト部の引き止め特性の向上、ケーブルのエポキシユニット内挿入作業性改善などをはかった。

また、エポキシユニットのケーブル挿入口間隔はユニット外径寸法と密接な関係があり、プレモールド絶縁体圧縮装置の構造を改良することにより、その外径寸法を縮小し、挿入口間隔およびユニット外径を縮小した。

また、エポキシユニットのケーブル適用サイズを200~2,000mm²の全サイズ共用として汎用性を高めた。

このように設計検討したYJにて接続作業性を確認するとともに、所定の性能を有することを検証した。

ここに開発・検討結果を報告する。

*1 電力技術開発グループ
*2 富津事業所品質保証課
*3 機器製造部第一製作課

2. 開発目標

154kV異種YJの目標性能と寸法を表1に示す。目標設定にあたっては、東京電力(株)殿購入仕様書を基本とした。

基本構造は66kV級をベースとしたもので、ケーブル挿入口が1口の面とその反対側の面に2口を有する構造で、各々の口にはOF/CVケーブルともに接続できる構造とした。

表1 開発目標
Development target

項目	条件	
対象ケーブル	CV	154kV 1,800mm ² (絶縁厚15mm)
	OF	154kV 800mm ²
YJ寸法	長さ 1,600mm以下 幅 330mm以下 高さ 660mm以下	
CV側電気性能	AC耐圧	295kV×1h (常温)
	Imp耐圧	±1,035kV×3回 (常温)
OF側電気性能	AC耐圧	300kV×3h (常温)
	Imp耐圧	-900kV×3回 (常温)
導体引き抜け性能	10kN以上	

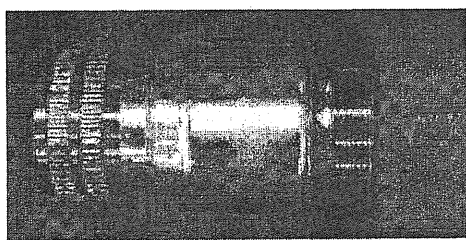
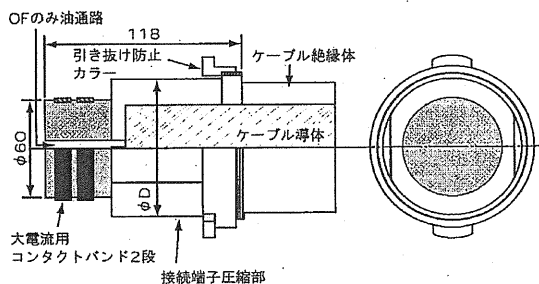


図1 接続端子および引き抜け防止構造

Connection terminal and Prevention structure drawing out

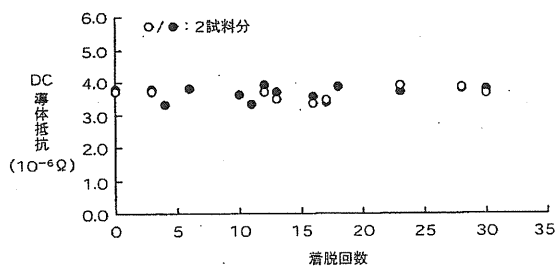


図2 着脱回数と直流導体抵抗

Relationship of connection times and DC resistance

3. YJの構造検討

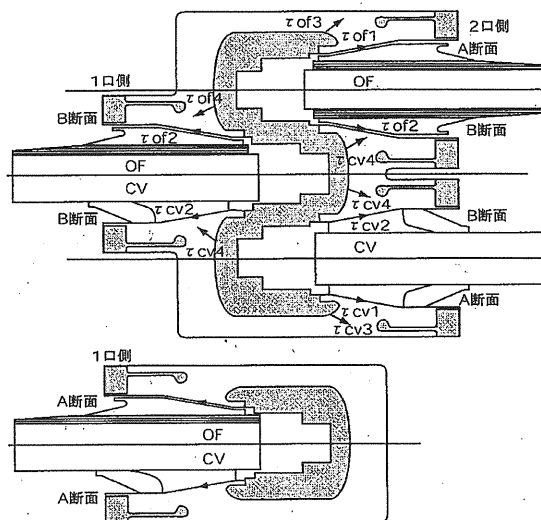
3.1 導体接続

従来66kVYJの導体接続方法は、チューリップコンタクトによる着脱機構を採用していたが、引き抜け力として2.5kN程度であり、10kN以上を確保するためには、引き止め機構を付加する必要があった。そこで、まず長手方向の寸法縮小に有効なマルチバンド(バンド2枚/3,000A仕様)を先端に装備した接続端子を検討した。さらに、このマルチバンドに引き止め機構としてエポキシユニットとねじ止め固定するように引き抜け防止カラーを設計した。図1にその構造を示す。

これにより長さ方向の寸法を約20%縮小できた。また、ケーブルの引き抜け力を測定した結果、エポキシユニット内の引き抜け防止カラーの変形により26.95kNで引き抜けており、目標性能を満足する結果が得られた。さらには、1回/年ペースの現地での着脱を想定し、着脱回数を30回として、2口側両方に接続端子を挿入して接続端子間の接触抵抗を測定(●試料/○試料)したところ、いずれも図2に示すように異常な抵抗上昇はなく、問題ないことを確認した。

3.2 エポキシユニット

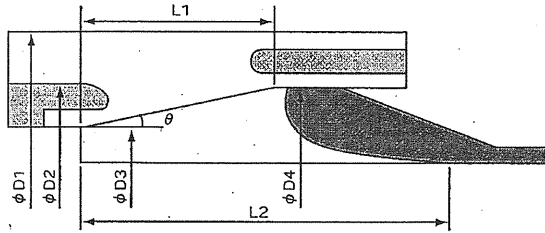
図3に示すとおり、CV/OFケーブル兼用のユニット構造とするために、個々のケーブル挿入口にそれぞれ遮へい電極、油止めシール構造を検討した。従来66kV級YJの絶縁設計をベースにした場合、エポキシ絶縁厚が50mm以上となるため、近年の高性能化技術²⁾³⁾をベースとして設



記号	設計部位
τ cv1 ~ τ cv4	ゴム-エポキシ界面電界 エポキシ電極先端電界
τ of 1 ~ τ of 4	油-エポキシ界面電界 エポキシ電極先端電界

図3 エポキシユニット構造(設計断面)
Structure of epoxy unit (design section)

計電界を検討し、エポキシ電極平坦部（長円半径部）で絶縁厚35mmに低減した。特に以降で述べる界面の電界とともに、内部電極先端の電界が設計電界を下回るように形状寸法を決定した。



部位	記号	154kVPJ	154kVYJ
ユニット外径	φD1	270	250
電極外径	φD2	188	180
ゴム先端外径	φD3	190	116.2
ゴム最外径	φD4	175	155
エポキシ界面長	L1	140	110
ケーブル界面長	L2	210	170
界面角度	θ	10	10

図4 ゴムストレスコーン形状寸法
Measurement of rubber stress cone

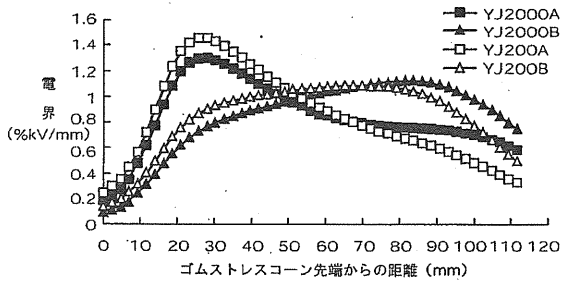


図5 ゴム-エポキシ界面電界(ケーブルサイズ& A/B断面)
Rubber/epoxy interface electric strength
(Cable size & A/B Section)

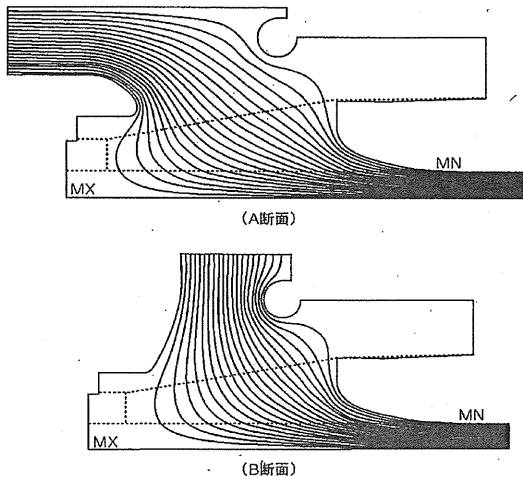


図6 CV側等電位線図
Electric field map of XLPE cable side

3.3 CV側絶縁構造

ゴムストレスコーンおよびその界面（ゴムストレスコーン/エポキシユニット、ゴムストレスコーン/ケーブル絶縁体）の設計もエポキシユニットと同様に、高性能化技術をベースにしてコンパクト化をはかった。ゴムストレスコーンの構造寸法をエポキシユニットとあわせて図4に示す。

また、一つのユニットで全サイズのケーブルに適用させるため、200mm²/2,000mm²絶縁厚17mmケーブルにおける各部の電界を確認した。ケーブルサイズによる界面電界の分布を図5に、等電位線図例を図6に示す。A断面で大サイズ側、B断面で小サイズ側の界面電界が高くなる傾向があるが、いずれも、界面設計電界以下におさまっていることを確認できた⁴⁾。

一方、プレハブ構造では界面の面圧分布も設計のポイントであり、応力解析により界面面圧と界面方向の分布を確認した。解析結果例を図7に示す。ゴムストレスコーン圧縮装置により電界が生じる界面では面圧0.5MPaを確保しているが、界面面圧は、界面形成後のゴムの馴染み（密着状態）によって、0.05MPa程度で十分な電気性能が得られることが知られており⁵⁾、今回設定される面圧レベルで界面電気性能は十分なものと判断される。

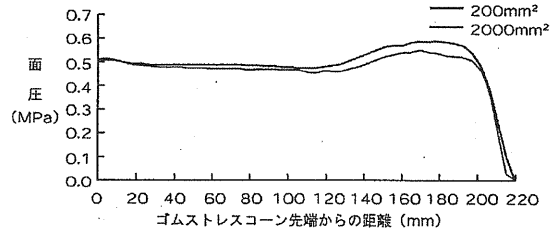


図7 界面面圧の解析結果
Analyzing result of interface pressure

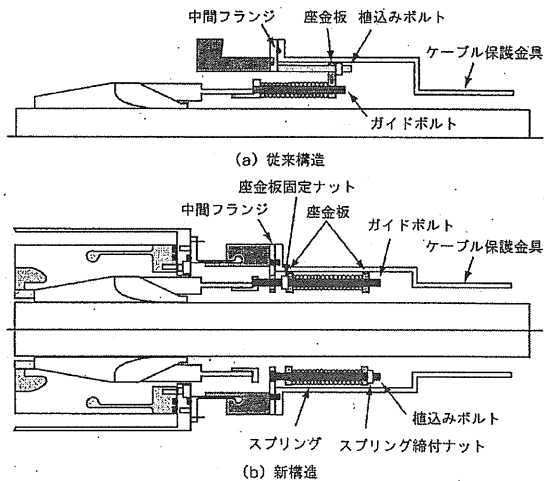


図8 ゴムストレスコーン圧縮構造
Structure of epoxy stress cone

3.4 CV側ゴムストレスコーン圧縮構造

ケーブル挿入口が2口側の間隔を縮小することにより、YJの高さ寸法の縮小がはかれることから、この間隔寸法を決めているゴムストレスコーン圧縮装置の構造検討を行った。

従来の圧縮装置構造では、二つの挿入口間隔を330mm程度確保しなければならなかったが、図8に示すように従来の圧縮構造におけるスプリング長を設定するための植込みボルトを、スプリング内にとおしたガイドボルトと同一円周上に交互に配置することにより、径方向の縮小をはかり、挿入口間隔を270mmと20%縮小した。これにより、YJ寸法の高さが585mmとなり、また同時に幅も縮小されて目標寸法をクリアできた。

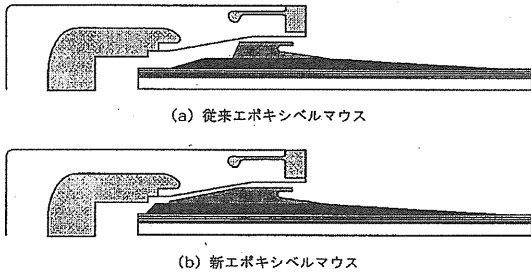


図9 エポキシベルマウス構造
Press units of rubber stress cone

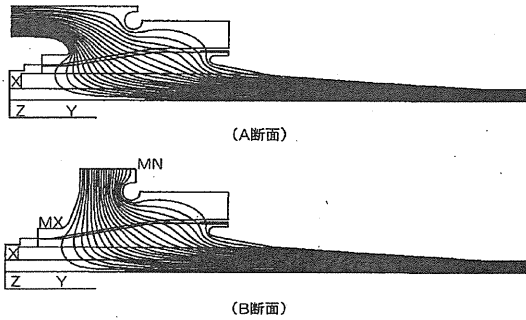


図10 OF側等電位線図
Electric field map of OF cable side

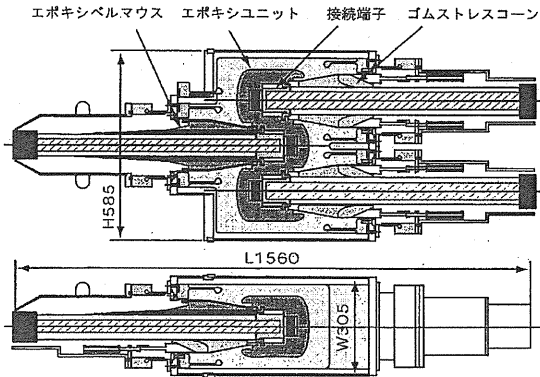


図11 YJ構造
Structure of YJ

3.5 OF側絶縁構造

CV/OF兼用のユニット構造としたため、OF側ではCV側ゴム/エポキシ界面形状にあわせたエポキシベルマウスによる電界遮へい構造とした。しかし、従来からのエポキシベルマウスでは、油/エポキシ界面電界が設計電界に対し裕度が小さいため、界面電界を低減する方策として、エポキシ材料と形状の検討を行った。これまでエポキシベルマウスに適用されるエポキシの比誘電率は4.2であるが、これを6.0の材料を適用することにより油との比誘電率の差を広げ、また、図9に示すとおりエポキシベルマウスの形状をエポキシユニット界面テーパ形状に沿った形状とすることで、油/エポキシ界面電界の均一化をはかった。この結果、界面電界を約25%低減することができた。OF側の等電位線図を図10に示す。

3.6 YJの構造と寸法

154kV異種YJの全体構造図を図11に示す。全長寸法は1,560mm、幅305mm、高さ585mmと目標寸法に収まるコンパクトなYJを設計することができた。

4. 初期電気試験

設計した154kVYJの初期電気性能評価を行った。適用したケーブルは154kV1,800mm²CVケーブルと154kV800mm²OFケーブルで、異種接続部を組立てた。初期電気試験結果を表2に示す。すべての試料でACおよびImp耐圧をクリアし良好な結果であった。破壊部位はいずれもOF側の油/エポキシ界面であった。さらにCV側のImp破壊性能確認のためにCVケーブルのみで組立てた試料でも耐圧値を大きく上回る電圧で、ゴムストレスコーン立ち上がり部で破壊した。これらの初期電気試験結果より、コンパクト化した154kVYJの設計の妥当性を検証できた。

5. 長期課通電試験

初期電気試験に続いて長期課通電試験により長期電気性能評価を行った。

試料は初期電気試験同様、CVケーブルとOFケーブルを組合せた異種接続部とした。図12にその試験線路を示す。通電によるヒートサイクルは、気中終端箱(EB-A)-CVケーブル-YJ-CVケーブル-EB-Aのループで、所定条件を与えて行った。

表2. YJ初期試験結果
Result of initial performance test

試料	項目	試験結果
OF/CV	常温AC	耐圧試験300kV×3時間OK 15kV×1時間ステップアップ 450kV×10分BD OF側エポキシ界面破壊
OF/CV	常温Imp	耐圧試験-900kV×3回OK 20kV×3回ステップアップ -1,140kV×1回BD OF側エポキシ界面破壊
CV/CV	常温Imp	耐圧試験±1,035kV×3回OK -50kV×3回ステップアップ -1,485kV×1回BD ストレスコーン立ち上がり破壊

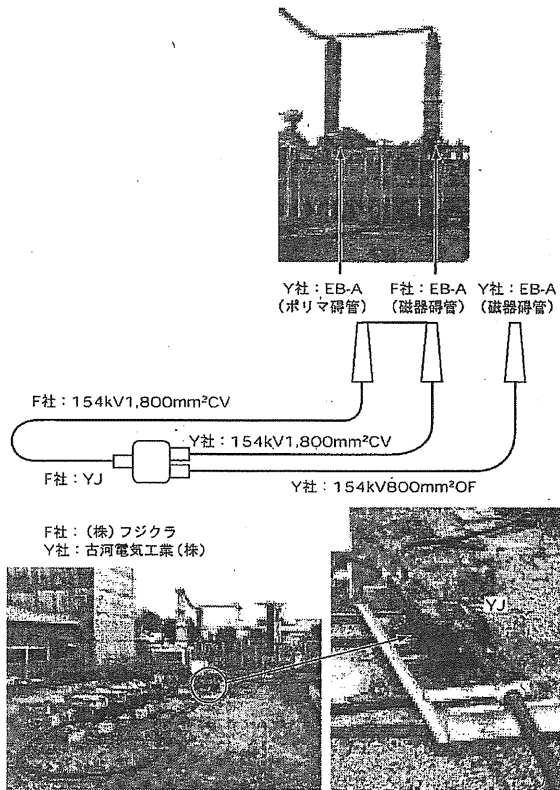


図12 長期試験線路
Long term aging test line

本開発では、古河電気工業(株)と(株)フジクラの共同開発を行うことで、開発の効率化をはかっており、長期試験フィールドを古河電気工業(株)千葉事業所内試験ヤードとした。試験設備の融通、線路建設における技術交流、試験進捗の情報伝達など両社が協力して試験実施に努めた。

試験電圧はOF側要求性能から150kVとし、通電条件は、CV側の通電であることから90℃×5か月/105℃×1か月とした。

試験線路のEB-Aには、従来の磁器製碍子タイプと古河電気工業(株)製シリコン複合碍管タイプの両タイプを供試し、同時にこれらのEB-Aの長期電気性能評価を行った。

長期課通電試験は、表3に示すとおり良好な結果であり、終了後残存試験を同事業所内で引き続き実施した。残存

表3 長期試験結果
Result of long term aging test

項目	条件/結果
長期試験	課電：150kV×6か月合格 ヒートサイクル： 90℃×5か月 & 105℃×1か月
残存試験	OF対CV 耐圧試験Imp-900kV×3回合格 ⇒耐圧試験AC200kV×10分合格 OFケーブルをCVケーブルに切り替えて、以降の耐圧・破壊試験を実施。
	CV対CV (OF→CV) 耐圧試験Imp±1,035kV×3回合格 ⇒耐圧試験AC175kV×10分合格 破壊試験実施 AC695kV×5分 試験端末破壊

試験ではOF側の耐圧を確認した後、OFケーブルをCVケーブルに組みかえて行った。この結果、CV側の耐圧を確認し、AC破壊試験でもYJで破壊しないという結果(試験端末破壊)が得られた⁹⁾。

6. むすび

今回、コンパクト化をはかった154kVYJの開発を行い、各種要求性能をクリアして、開発品が154kV実線路へ適用できる性能を有することを検証した。今後、既設線路への適用などで分岐接続に貢献できるものと考えている。

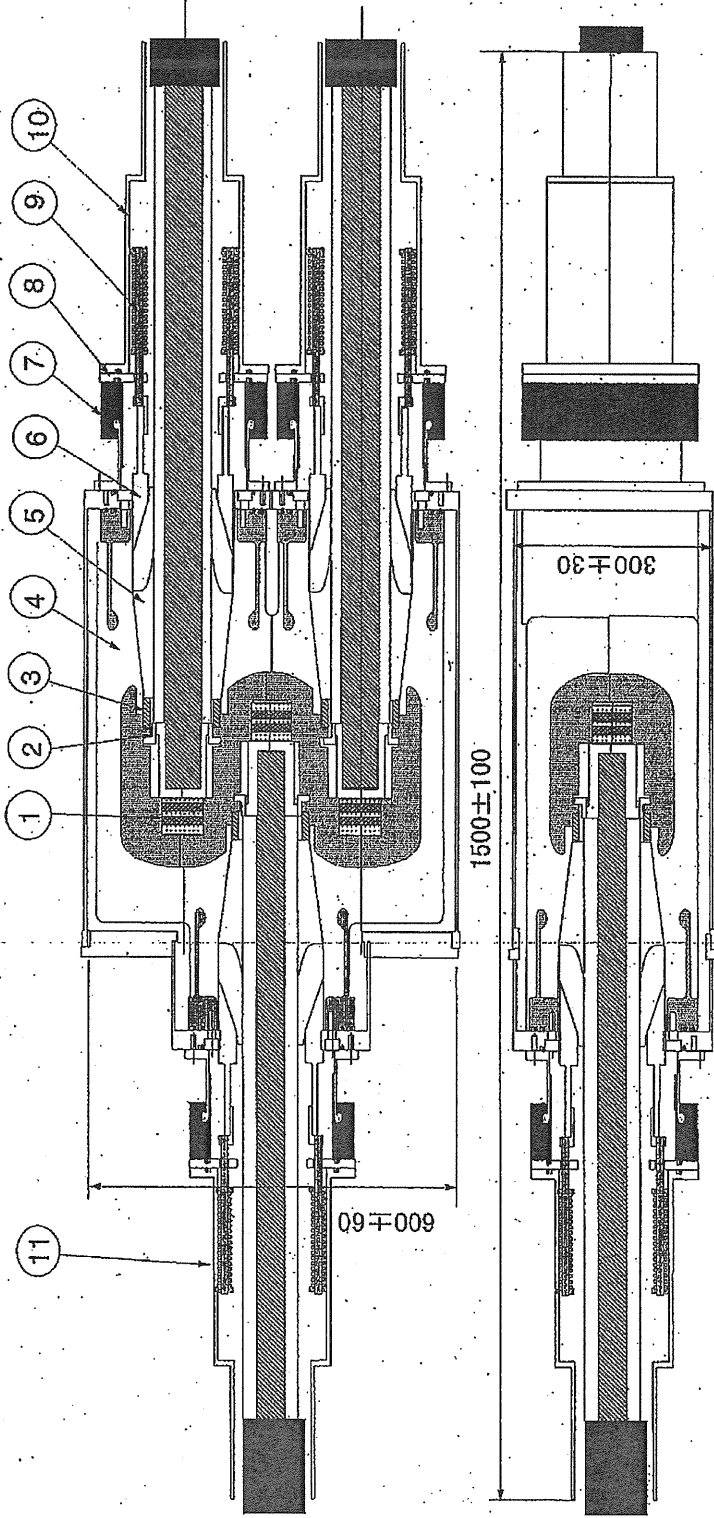
本開発は前述のとおり、古河電気工業(株)と(株)フジクラとの共同開発であり、開発にあたっては東京電力(株)殿のご指導をいただきました。深く御礼申し上げます。

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EVYJ-02002

MICRO.
NO.



No.	Name of Part	MATL	QTY	REMARKS
11	Copper sleeve(B)			
10	Copper sleeve(A)			
9	Spring			
8	Flange			
7	Insulator			
6	Insulating pipe			
5	Premolded stress relief cone			
4	Epoxy insulator			
3	Stopper			
2	Collar			
1	Conductor connector			
No.	Name of part			

No.	NAME OF PART	MATL	QTY	REMARKS
SCALE	Y-BRANCH JOINT			
3 RD. ANGLE	FOR 154~230kV			
UNIT: mm (inch)	XLPE CABLE			

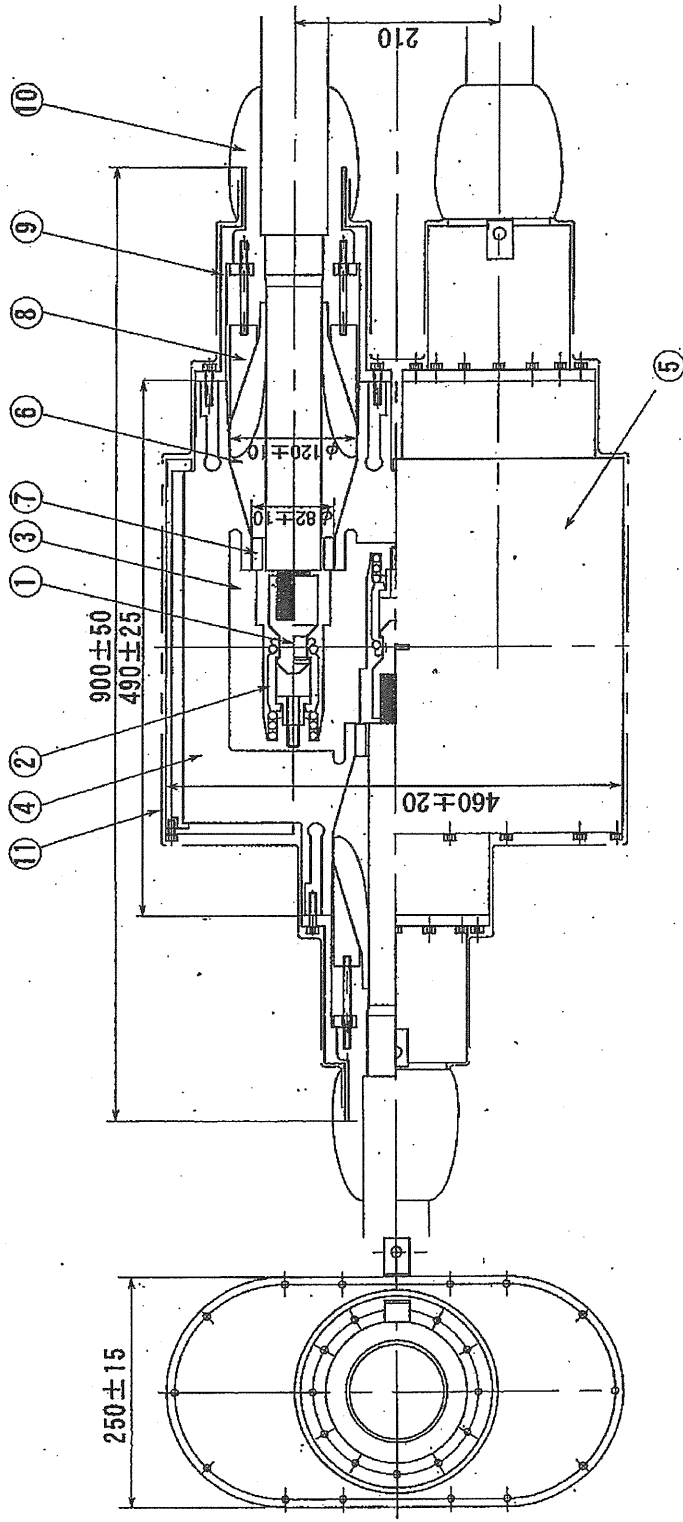
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30, JUL, 2002	

APPROVED: *[Signature]* CHECKED: *[Signature]*
 DESIGNED: *[Signature]* DRAWN: S. YOKOYAMA

VISCAS Corporation

60010-NVA

MICRO.
NO.



11	ANTI-CORROSION LAYER	6	PRE-MOLDED STRESS RELIEF CONE
10	WATERPROOF TAPE	5	CASING
9	LOWER SLEEVE	4	EPOXY UNIT
8	PUSH-UP RING	3	INNER SHIELD
7	STOPPER	2	CONNECTOR
	NAME OF PART	1	CONNECTING ROD
PART NO.	NAME OF PART	PART NO.	NAME OF PART

SCALE
3 RD ANGLE
UNIT: mm

Y-BRANCH JOINT FOR
66~132kV XLPE CABLE

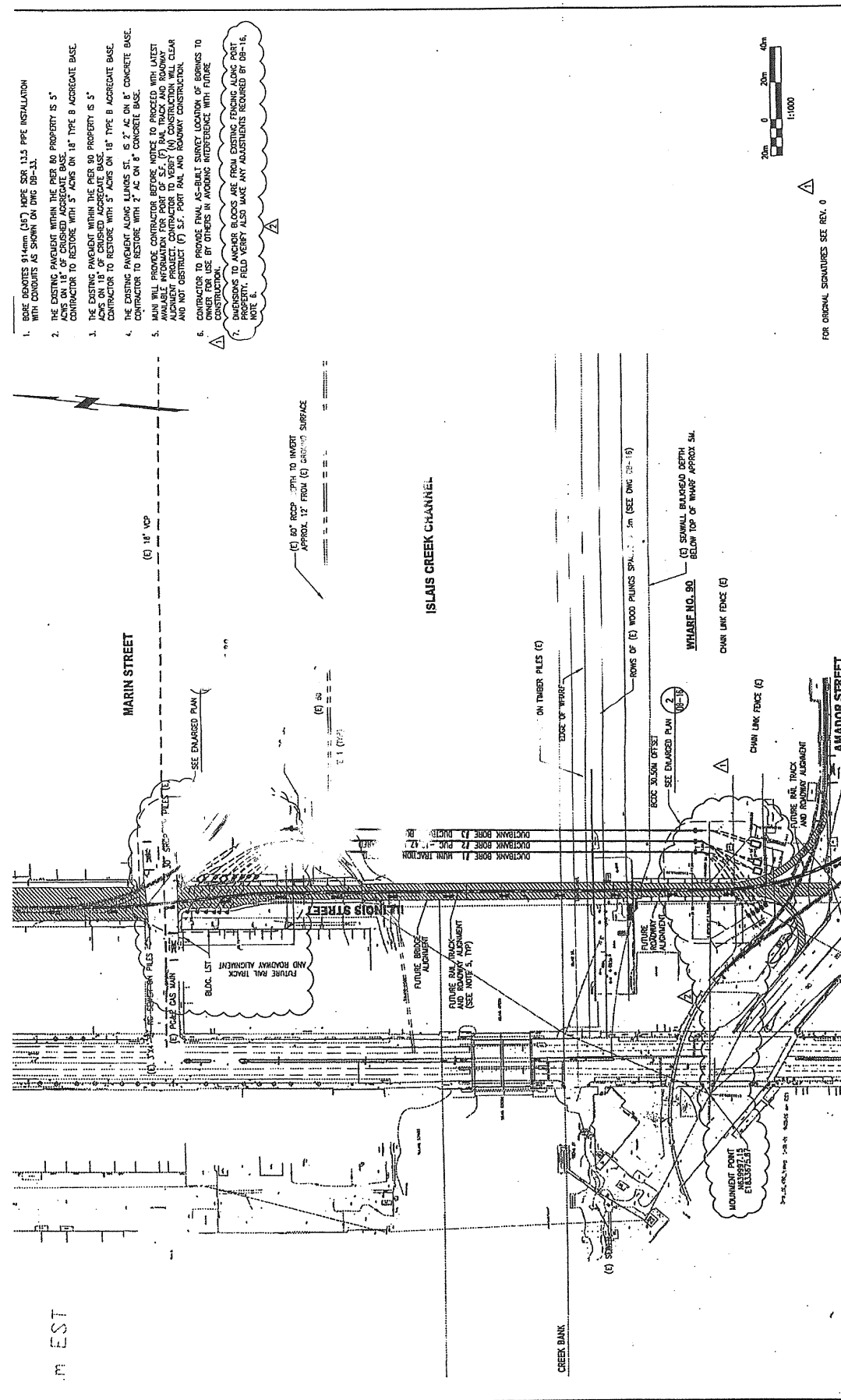
1 OF 1
14, DEC, 2001

APPROVED: *S. Yokoyama*
DESIGNED: *S. Yokoyama*

W/C VISCAS Corporation
CHECKED: *S. Goto*
DRAWN: S. YOKOYAMA


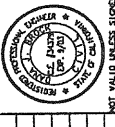
EVNJ-01009

Appendix D
Islais Creek Bore



1. BORE LOGS ARE 8" DIA. (12") MORE FOR 1.5" PIPE INSTALLATION WITH COORDINATES AS SHOWN ON DWG DB-31.
2. THE EXISTING PAVEMENT WITHIN THE PIER 80 PROPERTY IS 5" ACIS ON 18" OF CRUSHED AGGREGATE BASE. CONTRACTOR TO RESTORE WITH 5" ACIS ON 18" TYPE B AGGREGATE BASE.
3. THE EXISTING PAVEMENT WITHIN THE PIER 80 PROPERTY IS 5" ACIS ON 18" OF CRUSHED AGGREGATE BASE. CONTRACTOR TO RESTORE WITH 5" ACIS ON 18" TYPE B AGGREGATE BASE.
4. THE EXISTING PAVEMENT ALONG LUNDY ST. IS 2" AC ON 8" CONCRETE BASE. CONTRACTOR TO RESTORE WITH 2" AC ON 8" CONCRETE BASE.
5. MAIN WILL PROVIDE CONTRACTOR BEFORE NOTICE TO PROCEED WITH LATEST AVAILABLE INFORMATION ON THE LOCATION OF ALL UTILITIES WHICH MAY BE ENCOUNTERED AND NOT OBSTRUCT (C) ST. PORT RAIL AND ROADWAY CONSTRUCTION AND NOT OBSTRUCT (C) ST. PORT RAIL AND ROADWAY CONSTRUCTION.
6. CONTRACTOR TO PROVIDE FINAL AS-BUILT SURVEY LOCATION OF BORINGS TO OWNER FOR USE BY OTHERS IN AVOIDING INTERFERENCE WITH FUTURE CONSTRUCTION.
7. ANCHORS TO ANCHOR BLOCKS ARE FROM EXISTING FENCING ALONG PORT PROPERTY. FIELD VERIFY ALSO MAKE ANY ADJUSTMENTS REQUIRED BY DB-16, NOTE 6.

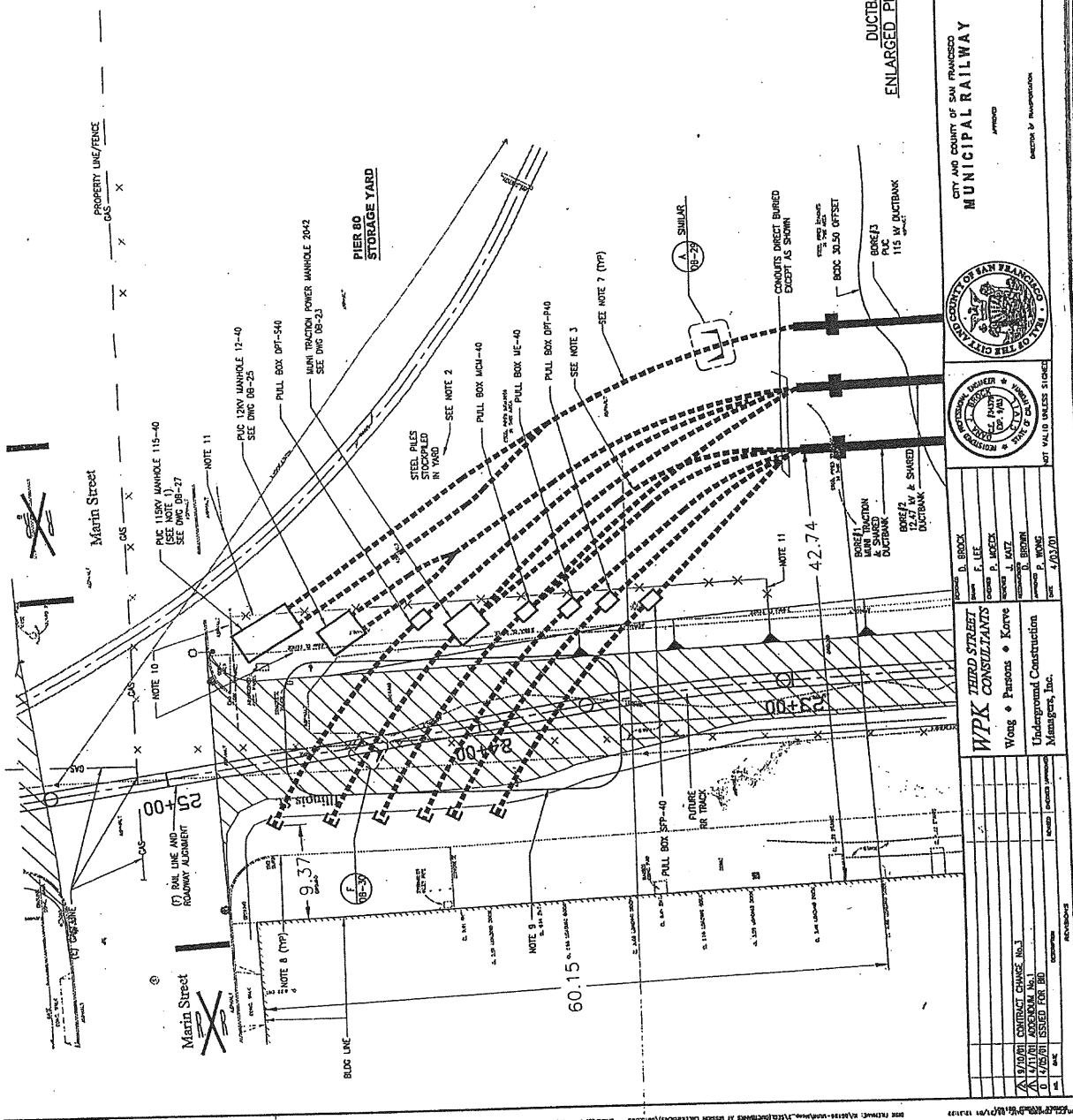
FOR ORIGINAL SIGNATURES SEE REV. 0

		CITY AND COUNTY OF SAN FRANCISCO APPROVED: _____ DIRECTOR OF TRANSPORTATION	
		NOT VALID UNLESS SIGNED BY: 4/24/01	
WPK THIRD STREET CONSULTANTS Wong & Parsons & Korte Underground Construction Managers, Inc.		PROJECT NO. MR-1148 DRAWING NO. CL-12254 SHEET NO. DB-14 TOTAL SHEETS DB-35	
CONTRACT CHANGE No. 3 APPROVED FOR DB-14 ISSUED FOR DB-14		ISLAIS CREEK DUCTBANK SITE PLAN	

DATE: 10/27/01
 DRAWN BY: [Name]
 CHECKED BY: [Name]
 APPROVED BY: [Name]

NOTES:

1. LOCATE EXISTING GAS LINE PRIOR TO EXCAVATION FOR PUC 115KV MANHOLES.
2. STOCKPILED STEEL PILES IN PIER 80 ANTICIPATED TO BE REMOVED BY OTHERS.
3. (C) STREET LIGHT ON FEDERAL TO BE RELOCATED BY CONTRACTOR. CONTRACTOR TO LOCATE, PART OF SAN FRANCISCO CONTRACT NO. 4-15-274-6523 FOR EXACT LOCATION FOR RELOCATION.
4. MINIMUM 15M RADIUS (WHEREVER POSSIBLE) AT CORNERS TO TOP OF EXISTING GRADE AND REPAIR EXISTING PAVEMENT.
5. CONTRACTOR TO CONFIRM PULLBOX AND MANHOLE LOCATION WITH ENGINEER PRIOR TO INSTALLATION (SEE NOTE 5 ON DRAWING DB-14).
6. FOR CONDUIT QUANTITY AND SIZE SEE DWG DB-31.
7. FOR TYPICAL DUCTBANK SECTION SEE DB-39.
8. SUB CONSULTS FROM EACH INV/PS TO LOCATION SHOWN STREET AND CAP. NO. OF CONDUITS IN EACH RUN AS SHOWN IN DB-31.
9. EACH RUN TO PASS THRU STEEL PIPE UNDER (F) RR TRACK TO BE CENTERED ON TRACK CENTERLINE. AN APPROXIMATE CHECK MEASUREMENT TO TRACK CENTERLINE CHECK MEASUREMENT FOR FINALIZED TRACK ALIGNMENT.
10. EXISTING FENCE DEMOLISH 51.0M (170FT) ALONG EAST SIDE OF LINKS SODWALK AND 3.8M (12FT) EAST OF EXISTING FENCE. EXTEND FROM EXISTING SODWALK SOUTH AND THEN WEST AS SHOWN. TIE-IN TO EXISTING FENCE AT BOTH ENDS.
11. PROVIDE NEW FENCE 3.8M (12FT) EAST OF EXISTING FENCE. EXTEND FROM EXISTING SODWALK SOUTH AND THEN WEST AS SHOWN. TIE-IN TO EXISTING FENCE AT BOTH ENDS.



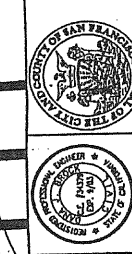
FOR ORIGINAL DIMENSIONS SEE REV. 0

1 DB-14

DUCTBANK ENLARGED PLAN DETAIL

PROJECT	MUNI METRO SYSTEM
CONTRACT	MR-1148
SECTION	CL-12255
DATE	DB-15
NO.	DB-35
REV.	2

CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL RAILWAY



APPROVED BY: [Signature]

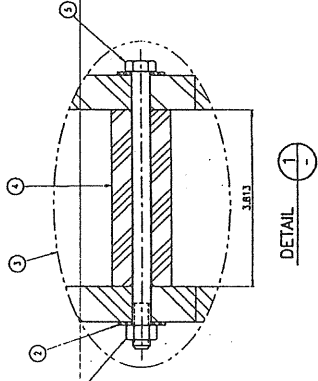
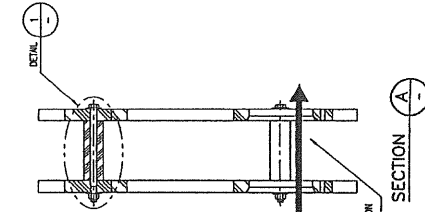
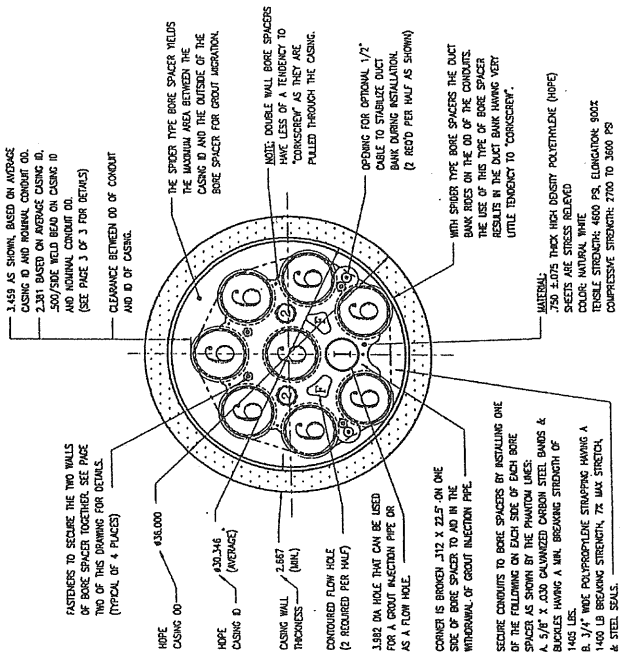
WPK THIRD STREET CONSULTANTS
Wong • Parsons • Kurve
Underground Construction
Managers, Inc.

CONTRACT CHANGE NO. 3	ISSUED FOR DB
ADDITIONAL AMENDMENT NO. 1	ISSUED FOR DB
DATE ISSUED FOR DB	4/15/20

DATE	4/15/20
BY	[Signature]
FOR	[Signature]
APPROVED BY	[Signature]

- NOTES:**
- USE ONE BORE SPACER FOR EVERY 5 FEET OF DUCT BANK.
 - THE CASING IS TO BE SMOOTH AND FREE FROM BURRS, PROTRUSIONS AND SEAMS THAT MIGHT IMPAIR THE SEALING OF DUCT BANK.
 - A TROUGH OR FEEDER BRIDGE SHOULD BE CONSTRUCTED AT EACH END OF THE CASING TO SUPPORT SECTIONS OF DUCT BANK AS THEY ARE ASSEMBLED AND PULLED INTO THE CASING.
 - IT IS POSSIBLE THAT THE DUCT BANK WILL BECOME "CONGREGATED" AS IT IS PULLED FROM THE CASING UNLESS AN "OFF CENTER WEIGHT TECHNIQUE" OR "STABILIZATION CABLES" ARE USED.
 - THIS BORE SPACER WILL ACCOMMODATE BOTH "SINGLE-END" AND TULSH COUPLED EXTRACTABLE INJECTION PIPE METHODS OF GROUT FILLING.
 - WHEN FILLING THE AREA BETWEEN THE CONDUITS AND CASING WITH GROUT, TAKE CARE NOT TO EXCEED THE MANUFACTURER'S COLLAPSE PRESSURE OF THE CONDUITS.
 - ACTUAL QUANTITIES OF GROUT USED SHOULD BE MEASURED AND RECORDED.

LIST OF MATERIAL	
ITEM NO.	DESCRIPTION
1	4 3/4"-16 HEX NUT (GRADE 2, CENTERLOCK LOCKING NUT, ZINC PLATED STEEL)
2	8 3/8" FLAT WASHER (1/8" DIA. 1000 GRADE 2, USS STAINLESS ZINC PLATED STEEL)
3	2 100 90-2259 BLANK BORE SPACER
4	4 100 90-003 SPACER BUSHING (TYPE 1 PVC DARK GRAY)
5	4 2 7/8"-18#4 LG HEX HEAD CAP SCREW (GRADE 2, ZINC PLATED LOW CARBON STEEL)



THIS BORE SPACER DESIGN IS COVERED BY ONE OR MORE PENDING PATENT APPLICATIONS. FURTHER, THE DRAWING AND PROPRIETARY DESIGN IS SOLELY THE PROPERTY OF UNDERGROUND DEVICES, INC. NO REPRODUCTION OR USE OF THIS DRAWING IS PERMITTED WITHOUT THE UNDERSTANDING THAT IT WILL BE KEPT IN STRICT CONFIDENCE.

PROJECT NO.	MR-1148
CONTRACT NO.	CL-12268
DATE	08-31/00
SCALE	0

CITY AND COUNTY OF SAN FRANCISCO
MUNICIPAL RAILWAY
 THIRD STREET LIGHT RAIL TRANSIT
 DUCTBANKS AT MISSION CREEK & ISLAIS CREEK
 DOUBLE WALL SPIDER TYPE PULLING SPACER



DESIGNED BY	WPK
CHECKED BY	Wong & Parsons & Korre
DATE	Underground Construction Managers, Inc.

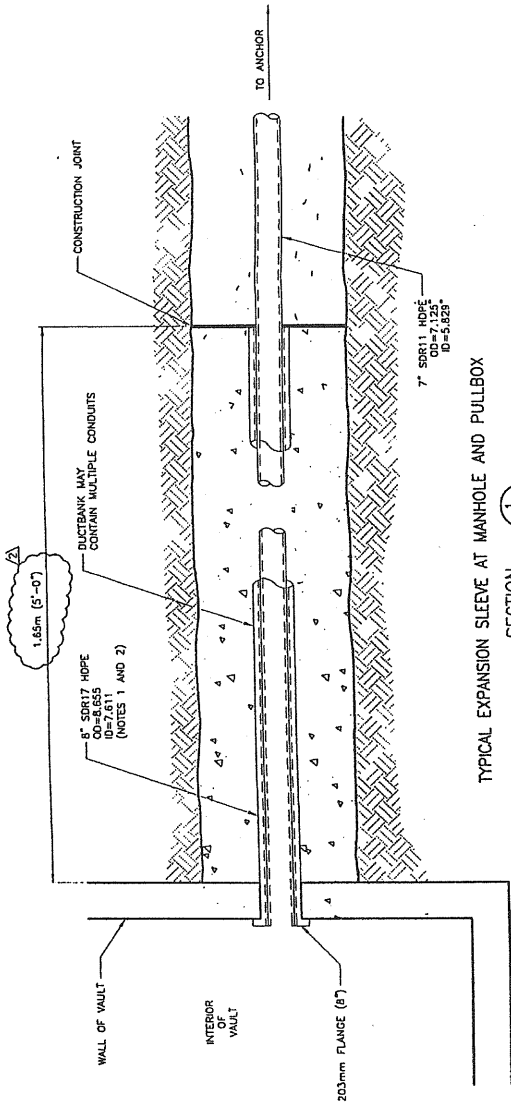
REVISIONS	NO.	DATE	BY	DESCRIPTION
	1			ISSUE FOR CONSTRUCTION
	2			
	3			
	4			
	5			
	6			
	7			
	8			
	9			
	10			

DATE: 08/31/00
 DRAWN BY: [Name]
 CHECKED BY: [Name]
 APPROVED BY: [Name]

NOTES:

1. SINCE 7" CONDUIT SHOWN, USE AS TYPICAL FOR 2", 4", 6" OR 7" DIMENSIONS. SEE SCHEDULE BELOW.
2. FOR QUANTITY AND SIZE OF CONDUITS, SEE PLAN.

SCHEDULE		
CONDUIT	O.D.	SLEEVE I.D.
7"	7.125"	8" DR17 7.611"
4"	4.500"	5" DR6 5.153"
2"	2.375"	3" DR17 3.088"
6"	6.625"	8" DR11 7.056"



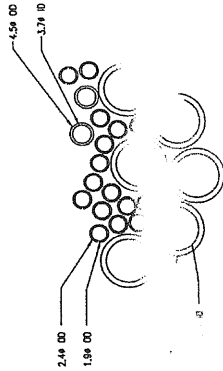
TYPICAL EXPANSION SLEEVE AT MANHOLE AND PULLBOX

SECTION INTS 1

FOR ORIGINAL SIGNATURES SEE REV. 0

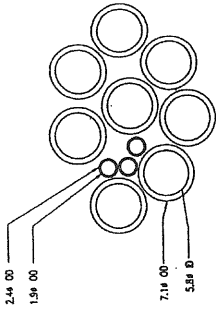
<p>MR-11148 CL-12269</p>		<p>MR-11148 CL-12269</p>	
<p>DB-32 /OB-35</p>		<p>DB-32 /OB-35</p>	
<p>MUNI METRO SYSTEM THIRD STREET LIGHT RAIL TRANSIT DUCTBANKS AT MISSION CREEK & ISLAIS CREEK</p>		<p>MUNI METRO SYSTEM THIRD STREET LIGHT RAIL TRANSIT DUCTBANKS AT MISSION CREEK & ISLAIS CREEK</p>	
<p>CITY AND COUNTY OF SAN FRANCISCO MUNICIPAL RAILWAY</p>		<p>CITY AND COUNTY OF SAN FRANCISCO MUNICIPAL RAILWAY</p>	
<p>WONG & PARSONS CONSULTANTS Wong & Parsons • Korve Undersground Construction Managers, Inc.</p>		<p>WONG & PARSONS CONSULTANTS Wong & Parsons • Korve Undersground Construction Managers, Inc.</p>	
<p>1/18/01 CONTRACT CHANGE No. 3 1/25/01 CONTRACT CHANGE No. 1 1/25/01 ISSUED FOR BID</p>		<p>1/18/01 CONTRACT CHANGE No. 3 1/25/01 CONTRACT CHANGE No. 1 1/25/01 ISSUED FOR BID</p>	
<p>DESIGNED BY: D. BRUCK CHECKED BY: F. LEE DRAWN BY: P. WONG APPROVED BY: P. WONG DATE: 4/03/01</p>		<p>DESIGNED BY: D. BRUCK CHECKED BY: F. LEE DRAWN BY: P. WONG APPROVED BY: P. WONG DATE: 4/03/01</p>	

MISSION CREEK
BORE NO. 1



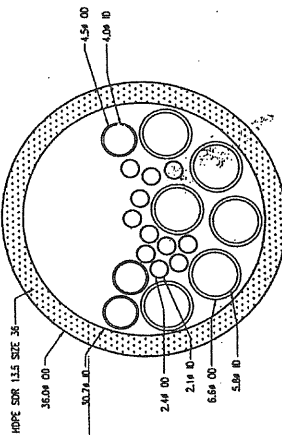
3/4" HOPE PIPE
16-2" HOPE PIPE
2-4" HOPE PIPE
6-7" HOPE PIPE

MISSION CREEK
BORE NO. 2



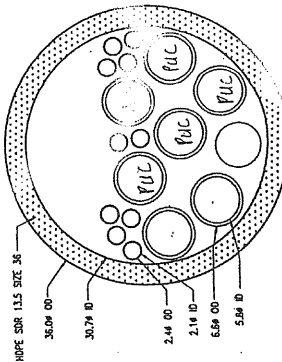
3/4" HOPE PIPE
8-7" HOPE PIPE
3-2" HOPE PIPE

ISLAIS CREEK
BORE NO. 1



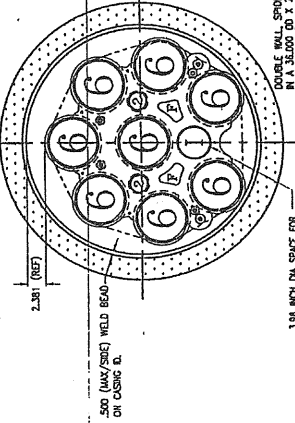
3/4" HOPE PIPE
12-7" HOPE PIPE
3-2" HOPE PIPE

ISLAIS CREEK
BORE NO. 2



3/4" HOPE PIPE
10-7" HOPE PIPE

ISLAIS CREEK
BORE NO. 3



DOUBLE WALL SPIDER TYPE BORE SPACER
IN A 36.00 O.D. X 2.50 WALL THICKNESS HOPE CASING
THE SPACER SHALL BE CALICO NO. 85233 BY UNDERGROUND
DEVICES, INC. (PATENT PENDING) CONTACT: DAVID CARROLL
1-800-860-7110

3/8" DIA. SPACE FOR
CIRCUIT INSULATION PIPE

0.50 (MAX/SIDE) WELD BEAD
ON CASING O.D.

2.381 (REF)

FOR ORIGINAL SIGNATURES SEE REV. 0

CITY AND COUNTY OF SAN FRANCISCO MUNICIPAL RAILWAY APPROVED: _____ DIRECTOR OF TRANSPORTATION				MUNI METRO SYSTEM THIRD STREET LIGHT RAIL TRANSIT DUCTBANKS AT MISSION CREEK & ISLAIS CREEK 914mm(36") HOPE CASING CROSS SECTIONS MR-1148 CL-12272 DB-35/ /DB-35 2			
WPK THIRD STREET CONSULTANTS Wong & Parsons & Karve Underground Construction Managers, Inc.		D. BOECK T. LEE P. LUDER J. WATZ D. BROWN P. WONG 4/03/01		1/10/01 CONTRACT CHANGE No. 3 1/10/01 ADDENDUM No. 1 1/10/01 ISSUED FOR BID		APPROVED: _____ DATE: _____	

EXHIBIT C

**BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA**

Application of PACIFIC GAS AND
ELECTRIC COMPANY, a California
corporation, for a Permit To Construct the
Potrero to Hunters Point 115 kV Cable
Project Pursuant to General Order 131-D

(U 39 E)

Application No.

A.03-12-039

**DECLARATION OF ROBERT BONDERUD
IN SUPPORT OF PACIFIC GAS AND ELECTRIC COMPANY'S REPLY TO PROTEST
OF THE CITY AND COUNTY OF SAN FRANCISCO TO THE APPLICATION OF
PACIFIC GAS AND ELECTRIC COMPANY FOR A PERMIT TO CONSTRUCT THE
POTRERO TO HUNTERS POINT 115 KV CABLE PROJECT**

MICHELLE L. WILSON
DAVID T. KRASKA
Law Department
PACIFIC GAS AND ELECTRIC COMPANY
Post Office Box 7442
San Francisco, California 94120
Telephone: (415) 973-7503
Facsimile: (415) 973-5520

JO LYNN LAMBERT
BEST BEST & KRIEGER LLP
3750 University Avenue
Post Office Box 1028
Riverside, California 92502-1028
Telephone: (909) 686-1450 or
(415) 973-5248
Facsimile: (909) 686-3083

Attorneys for Applicant
PACIFIC GAS AND ELECTRIC COMPANY

I, Robert Bonderud, declare as follows:

1. I am a senior land project analyst employed by Pacific Gas and Electric Company (“PG&E”), currently assigned to the Potrero-Hunters Point 115 kV Transmission Project. My business address is Pacific Gas and Electric Company, 245 Market St., Room 1052B, San Francisco CA 94105.

2. I have been employed for over 32 years at PG&E. During the last 11 years, one of my responsibilities has been to request public agency written position statements pursuant to CPUC General Order 131-D IX (B)(1)(d).

3. On September 17, 2003, I sent a letter to Mr. Larry Badiner, Acting Director of the City and County of San Francisco Planning Department, describing the Potrero to Hunters Point 115 kV Cable Project and requesting a written position statement regarding the project. A true and correct copy of this letter is attached to PG&E’s PTC Application as Exhibit H. I subsequently followed up the letter by leaving a voice mail recording on Mr. Badiner’s office phone asking for a meeting to explain the project and for the purpose of obtaining a written position statement.

4. On October 20, 2003, I received a voice mail recording from Mr. Badiner concerning my letter, stating that his department was not planning to provide a response.

5. On January 2, 2004, I sent a copy of a Notice of Application for a Permit to Construct the Potrero to Hunters Point 115 kV Cable Project, with a cover letter, to the Board of Supervisors of the City and County of San Francisco, the San Francisco Planning Commission, and Mr. Badiner, Acting Director of the Planning Department. I also sent a copy of the Notice to the Port of San Francisco Real Estate Department. In addition, although not required, I also sent Mr. Badiner a full copy of the Application and PG&E’s Proponent’s Environmental Assessment.

6. On January 7, 2004, I sent a revised Notice of Application for a Permit to Construct, with another cover letter, to the Board of Supervisors, the Planning Commission, Mr.

Badiner at the Planning Department, and the Port of San Francisco Real Estate Department. The revised Notice corrected a typographical error on the project schedule sent out with the Notice on January 2, 2003.

7. PG&E has been involved in the numerous discussions during 2002-2003 between CCSF and PG&E about the proposed construction of a 115 kV Cable Project to be constructed between PG&E's Potrero and Hunters Point Switchyards. These discussions were of both technical nature as well as negotiations for a possible joint project that might meet their respective needs and offer cost savings to both entities. No agreement was ever reached on a specific plan for a joint project, but PG&E understood that CCSF hoped to construct a line to serve a new substation and other needs. On its own, as the meetings continued, CCSF bored and installed a bore casing containing conduit under Islais Creek as part of its San Francisco Light Rail Project. During subsequent meetings with CCSF, PG&E shared information about the concurrent work to study multiple routes as part of the process to obtain certification for a reliable route for the project by the CPUC. PG&E retained Black & Veatch, outside engineering experts, to evaluate the suitability of CCSF's Islais Creek crossing, but the experts found the condition of the crossing so questionable that there could be no assurances as to its feasibility for enclosing a major transmission line (much less two transmission lines as PG&E and CCSF had been discussing). Analysis included soil borings to determine soil profile characteristics and soil thermal properties. CCSF has not addressed PG&E's engineering consultant's concerns and has represented in meetings that any such resolution would be at PG&E's ratepayers' cost and at PG&E's risk. PG&E thus began to believe that other routes might more-appropriately meet project goals.

8. As part of PG&E's review of possible routes, PG&E obtained from CCSF available technical data about Islais Creek crossing, including engineering and installation, for determining its suitability to be used for a 115 kV transmission cable. This data was analyzed by PG&E personnel as well as PG&E's engineering consultant, Black & Veatch. PG&E obtained

additional soil borings at Islais Creek to supplement the CCSF data in order to make ampacity calculations.

9. On September 16, 2003, PG&E representatives met with CCSF representatives Ed Smeloff, Marla Jurosek and Sandra Rovetti from CCSF's Hetch Hetchy Power and Water Department. In this meeting, John Meade, PG&E's project manager, provided to CCSF representatives a copy of the draft letter in which PG&E requested a position statement from CCSF about the proposed project. This is the letter I sent to Larry Badiner, CCSF Planning Department Acting Director, in final form the next day. At the meeting, PG&E representatives asked CCSF to provide a position statement and explained that, if PG&E did not receive a position statement, PG&E would indicate in its application that no response was received.

10. On November 10, 2003, PG&E and CCSF representatives met again. Present were Ed Smeloff, Sandra Rovetti, Angel Camerino and Jacqueline Minor (from the City Attorney's Office). In this meeting, PG&E informed CCSF that PG&E planned to file its PTC Application in December, 2003. PG&E representatives explained that they needed to file in December in order to maintain the schedule to complete the project construction in 2005. CCSF representatives did not object to this plan. After the filing of the PTC Application, PG&E's attorney left a voicemail for CCSF's lead attorney for transmission siting, Joe Como, providing a status update as to the filing before the expiration of the protest period.

11. PG&E has had ongoing discussions with various personnel from the Port of San Francisco. The Port has indicated it has serious concerns about PG&E adding a fourth bore crossing under Islais Creek. Port officials indicated that there were no likely locations to add an additional bore. They also voiced concerns that the Port development would be impeded, and indicated that they were opposed to another bore in this location.

12. PG&E has undertaken preliminary reviews of the costs for the alternative routes. The approximate cost for the PG&E proposed route is \$26.6 million, exclusive of substation costs, which are another \$4.3 million and common to all routes. Based upon

information PG&E has available concerning completing the Islais Creek route, the approximate cost for this route is \$26.8 million. This calculation assumes that the existing conduits can be rehabilitated without adding a new bore. It also assumes that the amounts that have been offered to CCSF and the Port for purchase of the Illinois Street facilities and the Islais Creek crossing will be accepted (which they have not been to date). For purposes of these calculations, rehabilitation costs for the Islais Creek crossing are roughly estimated at \$500,000. If the existing casing is found inadequate and PG&E must replace the casing and create a new bore (assuming it is feasible to do so), the additional work would cost up to \$4.5 million and would add approximately two years to the project schedule.

13. PG&E has been informed that the Port's construction schedule for its Illinois Street Intermodal Bridge project begins in July 2004 and ends in December 2005. The bridge is immediately adjacent to the Islais Creek conduit crossing, and the Port will be using the surface area over the conduit for its lay-down areas. Not only would PG&E likely be precluded from construction activities at either end of the conduit, PG&E could also be precluded from doing further investigation and testing on the conduit's feasibility.

14. The CPUC deemed PG&E's Application complete on April 1, 2004.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct of my own knowledge or, on information and belief, from information provided to me that I believe to be true.

Dated: May 21, 2004

/s/
Robert Bonderud

CERTIFICATE OF SERVICE BY MAIL

I, the undersigned, state that I am a citizen of the United States and am employed in the City and County of San Francisco; that I am over the age of eighteen (18) years and not a party to the within cause; and that my business address is Pacific Gas and Electric Company, Law Department B30A, 77 Beale Street, San Francisco, California 94105.

I am readily familiar with the business practice of Pacific Gas and Electric Company for collection and processing of correspondence for mailing with the United States Postal Service. In the ordinary course of business, correspondence is deposited with the United States Postal Service the same day it is submitted for mailing.

On the 24th day of May, 2004, I served a true copy of:

**PACIFIC GAS AND ELECTRIC COMPANY'S REPLY TO PROTEST OF
THE CITY AND COUNTY OF SAN FRANCISCO TO THE APPLICATION OF
PACIFIC GAS AND ELECTRIC COMPANY FOR A PERMIT TO CONSTRUCT THE
POTRERO TO HUNDERS POINT 115 KV CABLE PROJECT**

[XX] By U.S. Mail – by placing it for collection and mailing, in the course of ordinary business practice, with other correspondence of Pacific Gas and Electric Company, enclosed in a sealed envelope, with postage fully prepaid, addressed to:

Parties on the CPUC service lists for A.03-12-039 and A.99-09-006

[XX] By Electronic Mail – serving the enclosed via e-mail transmission to each of the parties listed on the official service list for providing an e-mail address.

I certify and declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

Executed on this 24th day of May, 2004, at San Francisco, California.

/s/

GERIANNE M. JOHNSON