

December 16, 2004

Babcock & Brown Power Operating Partners LLC
2 Harrison Street, 6th Floor
San Francisco, CA 94105

Dear David Parquet and the Trans Bay Cable Project Planning Team:

On behalf of San Francisco Baykeeper, a project of Waterkeepers of Northern California (“Baykeeper”) we offer these preliminary comments on the proposed Trans Bay Cable Project.

First, let us thank you for your sincere effort to involve the community in the early stages of planning and environmental consideration for this project. We hope that these comments will serve to inform you of our concerns about a project this complex in our unique estuary and to bring about the most effective management of the Bay ecosystem and the most efficient use of your resources. These comments are brief due to Baykeeper’s limited involvement and thus do not preclude any future concerns that Baykeeper may have of the final monitoring plan, EIR, final plan implementation, or any unforeseen impacts. It is these impacts that we urge you to identify now, early in the process, before a great deal of capital investment has been put forth.

General Comments

Overall, the Trans Bay Cable project is commendable in its goals. The City of San Francisco now relies on a limited power delivery system that is vulnerable to service interruptions. It will come under further pressure as the population grows and the infrastructure continues to age. The current power plants at Potrero Hill and Hunter’s Point are relics of a bygone era, evading many of the regulations that govern modern power plants. They pollute the air and water with NOx, SO2, ground level ozone, particulate matter, and heavy metals. These plants are scheduled for retirement in 2006-8. A viable alternative must emerge to supply power to the city. The ‘generation-rich’ East Bay provides an attractive solution to this problem – if an effective delivery route can be found.

The current plan, to bury a Bundled HVDC cable in the sediment from Pittsburg, through Suisin, San Pablo, and North San Francisco Bays to Potrero Point has

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been put forth as the most viable alternative at this time. As the Project Coordinators have explained, it has become possible to undertake such a project as advancements in the technology of underwater vehicles have reduced both cost and uncertainty of cable installation. The Project Coordinators have described projects very similar to this one that have met with great success around the world.

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While this technology may be well suited for some cases, we cannot assume it is appropriate in all cases. Not all seabeds are the same. The San Francisco Bay Estuary is not like open ocean of the Irish Sea or The Bass Strait, where the Irish and Tazmanians have been well served by trans-oceanic cables. We have been directed to two projects that are most similar to the Transbay Cable proposal: the Cross-Sound Cable across Long Island Sound (NY) and the NEPTUNE project in the Raritan watershed (NJ). We point out that both have been set with problems that have stalled their successful completion. The San Francisco Bay shares many of the challenges of these projects – nearby urban areas, heavy boat traffic, sensitive benthic habitats, and large fishing communities. Our Bay also shares a particular troubling feature with the NEPTUNE project, which is currently stalled indefinitely. Both have a long history of contamination. Our central concern with the Trans Bay Cable Project is that by disturbing six square feet of sediment over 55 miles of the Bay, huge amounts of this toxic contamination, currently entombed in the Bay floor, could become suspended in the water column and enter the food chain.

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With a watershed of 63,000 square miles, the estuary drains 40% of the land area of California through an opening of less than 4000 feet at the Golden Gate. It has been the ultimate repository for the runoff from the many mining operations and industrial facilities that have been established here since the time of the Gold Rush. The Sacramento Valley, which drains into the watershed, has been one of the most heavily farmed regions of the world for over a hundred years. During this time, millions of tons of pesticides and herbicides have been applied to the land. Many of the chemicals applied to the land between 1950 and 1975 have been found to be carcinogenic, teratogenic, or in other ways toxic and have thus been banned. Currently, the San Francisco Regional Water Quality Control Board oversees 21 Superfund sites; 19 toxic pit sites; 2000 spills, leaks, and cleanups; 10,000 fuel leak sites; and 50 brownfields in the area, many on the immediate shoreline. (Wolfe, Nov 6, 2004) A great many compounds have run into the Bay, directly along the proposed route of this project. Many of them have a natural attraction to organic material, so as they enter the water column, they adsorb, or

attach to the outside of, sediment particles and settle to the bottom. Over time, they are covered over by more sediment and become trapped in the Bay floor.

The most dangerous of these compounds are those designed in the early years of chemical engineering, a time when chemical engineers were able to synthesize an extraordinary array of compounds but before doctors and scientists became aware of the long term problems they would pose. They are often incredibly stable and resistant to decay. Many can interfere with the delicate processes of life. They pose no harm when buried in sediment, but if they are released into the food chain, they gain entry into the bodies of aquatic wildlife and thus, into the bodies of fish-eating humans. The active sediment layer, from which sediment is currently re-suspended due to wave and tidal action is no more than 33cm, perhaps as little as 10 cm in San Pablo and Suisin Bays, comprising between 3 and 10 years of accumulation (assuming a sediment accumulation rate of 3.1 cm/yr). (Davis, 2003; Fuller et al., 1999) The proposed project could re-suspend sediment buried up to 2m deep. By liquefying this sediment, comprising 80 to 150 years of accumulation, (Fuller et al., 1999) this project could release a vast number of dangerous compounds into the food chain. We urge that adequate studies be undertaken to determine the ultimate consequences of fluidizing such contaminated sediment.

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Specific Comments

History of Contamination

San Francisco Bay is one of the few large estuaries on the western coast of North America. Its watershed comprises 63,000 square miles, 40% of the total surface area of the State of California. It has a long history of chemical contamination. Evidence shows that from the first years of Spanish settlement in 1769, toxic compounds were already beginning to accumulate in the sediment of the Bay floor, perhaps as a result of clearing the land by fire. (van Geen and Luoma (1999) citing Hornberger, et al. (1999)) The contamination accelerated during the late nineteenth century as mining operations in the Sierra Nevada foothills released toxic heavy metals, especially mercury, from the hillsides. These metals ran into rivers and settled into the sediment of the Bay and Delta. Soon after these mining operations began, agriculture in the Central Valley expanded dramatically, driven by irrigation water diverted from these same rivers. During

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13-3 the twentieth century, millions of tons of fertilizer, herbicides, and pesticides spilled off this farmland into the Bay. Early compounds, such as the inorganic arsenicals were dangerous in their own right, but between the two World Wars a new generation of chemists was synthesizing far more dangerous chemicals, among them the chlorinated hydrocarbons. These, which include the chlorinated hydrocarbon insecticides (DDT, dieldrin, chlordane, toxaphene, etc.), PCBs, and dioxins, have not only been shown to be dangerous to human systems but are particularly resistant to decay, especially when suspended in sediment. They were banned from manufacture in the 1970s, but in the intervening 50 years of use and illegal disposal, many tons were dumped into the Bay. The contamination continues today. In heavily farmed areas, between 1,250 and 4,300 pounds of pesticides are used per square mile annually. (TBI (1998) citing Brown and Caldwell (1990)) A 1992 report by the San Francisco Estuary Project estimates that current toxic release is on the order of thousands of metric tons per year. (Monroe and Kelly, 1992)

13-4 Many of the contaminants mentioned above have low water solubility and thus partition quickly out of the water column. If they are not ingested by an aquatic animal, they are likely to attach to sediment particles, settle to the bottom, and become embedded in the sediment. (Davis, 2004, Ling et al. 1993) They are persistent in the environment, bioaccumulative in the food chain, and have a profound effect on human health. Of particular alarm are their carcinogenic properties and their effect on the proper development of the human fetus. Our central concern with the Trans Bay Cable Project is that by disturbing six square feet of sediment over 55 miles of the Bay, huge amounts of these toxic chemicals could become suspended in the water column and enter the food chain. It should be noted that sediment in upstream locations has shown to be more contaminated than downstream locations. (Vankatesan et al., 1999) The portion of the cable buried in Suisun Bay is particularly worrisome.

13-5 Due to considerations for recreational anchors, the cable must be buried 1 to 2 meters deep in this sediment along its entire 55 mile path. To accomplish this, a hydroplow will direct water at a pressure upwards of 100 psi into Bay floor, disturbing between 27,000 cubic meters and 54,000 cubic meters of sediment. The sediment will 'fluidize' and the cable will sink to the appropriate regulated depth. Not enough is known about this process. Specifically, to what extent will the chemicals entombed in this liquefied sediment be released into the aquatic environment? We urge that the proper studies be undertaken to answer this

question. Of particular concern is sediment from the years of greatest Chlorinated Hydrocarbon (CHC) contamination, between 1950 and 1975.

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Through conversations with colleagues at NY/NJ Baykeeper regarding their experiences with the proposed NEPTUNE project, we have come to understand that dredging may be required to achieve favorable bottom conditions for the hydroplow. We have not been made aware of any dredging required in this project. Dredging can have significant impacts on the Bay floor. We urge that any dredging activity be undertaken with the greatest caution and consideration for this sensitive and important habitat.

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Special Areas of Concern

Suisin Bay

The coastline west of Pittsburgh is heavily industrialized, and we would recommend particular sensitivity when disrupting the sediment in this area. As the proposed route leaves Pittsburgh heading west, it passes a shoreline with a long history of military and industrial tenants. It passes first by a sewage outfall at Mallard Island and around Stake Point, where the General Chemical Bay Point Works chemical plant stands just before Middle Point. Beginning with this facility, we pass a long stretch of potentially contaminated coastline. The Concord Naval Weapons Station encompasses 7,000 acres along two miles of shoreline from Belloma Slough to Pacheco Creek and also includes Seal, Roe, and Ryer Islands to the north. It was from this well-protected port that the Navy provided munitions for its Pacific fleet during WWII, Korea, and Vietnam. It is included in the National Priorities List (Superfund) program, identifying it as one of the most highly contaminated sites in the country. According to this program administered by EPA, "Soil, sediments, and surface water are contaminated with heavy metals including zinc, copper, lead, cadmium, and arsenic, as well as SVOC [(semi)volatile organic compounds] and pesticides... Tidal action in the wetlands inundated the sources, carrying contamination to Suisun Bay." (USEPA) On the east side of the Weapons Station, is Pacheco Creek. Upstream in this creek stands the Tosco Avon Oil Refinery. The process of refining petroleum produces many harmful byproducts, including dioxin, which are discharged into this creek and flow to the Bay. To the West, there are additional petroleum refineries, discharging these same toxic compounds into the Bay.

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These facilities were built along this shoreline in part because the Bay provides a convenient repository for their outflow. Chemicals from these sites may lie suspended in the sediment today. This stretch of almost 15 miles from Pittsburg to Davis Point is an area of special concern, requiring testing at a more frequent interval than 1000 yards. If the contamination is too great, an alternative route, north of Ryer Island, could be explored.

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Potrero Point

There is little doubt that the sediment around Potrero Point, the proposed terminus for the cable, has been heavily contaminated. We understand that the project design team is sensitive to this fact and will likely opt to use directional drilling technology to avoid re-suspending this sediment. We urge caution even with this seemingly benign approach, and recommend extensive testing and monitoring of this site.

Chemicals of Concern

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Chlorinated Hydrocarbons (CHCs) –

CHCs are a family of chemicals characterized by one or more hydrocarbon rings attached to one or more chlorine atoms, and often other compounds. They have been released into the water as a result of an accident, such as an electrical transformer explosion, after agricultural application such as to protect crops from insects, or from illegal dumping. CHC exposure can impact many of the body's systems, with negative impact on proper respiratory, cardiovascular, gastrointestinal, endocrine, dermal, and ocular function. Many are listed by the EPA as 'probable human carcinogens'. (ATSDR – Chapter 3)

It is important to understand how these compounds came to exist. PCBs (polychlorinated biphenyls) are a class of 209 chemicals that were produced in mixtures known as Araclors by the Monsanto Company between 1929 and 1977. Commercial manufacture produces some combination of different congeners. Each of these congeners reacts differently with body. Their number classification is based on their number of chlorine atoms. The more chlorinated a PCB congener, the more resistant it is to decay. While UV-B or high temperatures will break up highly chlorinated PCBs, even the residual products persist in the environment. The highest levels of PCB contamination in San Pablo Bay are between 60-70 cm. (Venkatesan, 1999)

Furans (PCDFs) and dioxins (PCDDs) exist as byproducts of industrial processes and the combustion of other compounds, especially chlorophenols, chlorobenzenes, and PCBs. They are among the most toxic synthetic substances known to science. They are also highly persistent.

Chlorinated hydrocarbon pesticides, including DDT, were first hailed as miracle chemicals when they were introduced in 1938. Their ability to protect crops from insects and other pests was unmatched. Unfortunately, they too are highly toxic to humans and wildlife. This was not fully understood until the 1970s, at which time they were banned for use in the United States. In the intervening years, millions of tons ran into Bay after rains or illegal dumping. These chemicals are highly persistent and remain in the sediment today.

Health Effects

Given the brief nature of these comments, we will only discuss one pathway of negative health effects – the manipulation of endocrine function. The CDC provides a full discussion of health effects through the Agency for Toxic Substances and Disease Registry's catalogue of Toxicological Profiles.

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Many CHCs and their metabolites affect the proper balance of hormones in the body by mimicking their chemical and physical properties in several different ways. They can fool the brain into thinking there is a high level of a particular hormone in the blood, triggering it to send the signal to stop producing that hormone, with a resultant shortage. They can bind to the chemicals that are meant to neutralize the hormone, with a resulting overload. They can induce or suppress the production of enzymes in the liver meant to metabolize the hormone, again changing the natural levels. Any of these, or a combination of several, will have a profound effect on the body.

Two examples of affected hormones are the thyroid hormone and estrogen. Both play vital roles in the delicate and irreversible process of prenatal development.

During development the thyroid hormone directs process of organizing the developing brain. For the period between 8 weeks, when brain development begins, and the time of thyroid hormone production (10 – 12 weeks), the fetus relies on thyroid hormone from its mother. A thyroid deficiency during this period results in cretinism, with symptoms including deaf-mutism, spasticity, gait disturbances, profound mental retardation, and complete or partial inability

to stand. (Porterfield and Hendry (1998) citing Stanbury (1984); Donati et al. (1992); Rogan and Ragan (2003)) Even after this period, a lack of thyroid hormone can impair neurological development, shown later in life as learning and behavioral disorders such as attention problems, impaired memory and diminished spatial perception. Brain development continues until several weeks after birth and can be affected by CHCs that are secreted through a mother's breast milk. (Klein, 1972) Such problems have been reported in a study of children born in the early 1980s to women who had eaten large amounts of Great Lakes fish shown to have high CHC levels. (Jacobson and Jacobson, 1996) They continue to become increasingly common in our society.

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Estrogen levels can also be affected, especially by DDT and other pesticides that were used so heavily in the Central Valley. A male exposed to estrogen mimicking compounds can develop malformed sexual organs and feminized behavior. (Vreugdenhil et al., 2002; Skakkebaek et al., 2001) Sterility or more serious consequences will result. Although the mother's estrogen will not cross through the placenta, estrogen mimicking chemicals from outside the body do cross into the fetus' bloodstream. Other compounds, such as some of the dioxins, work in the opposite way, binding to the receptors meant for estrogen without activating them. This leads to an estrogen deficiency, especially damaging to the female fetus. (Soto, et al., 1994; Lascombe, et al., 2000)

Heavy Metals

Heavy metals exist naturally in the earth's crust and naturally leach into the environment in low levels. Human activities such as mining and the burning of fossil fuels can release these metals at much higher levels. Such mining began in earnest in our watershed in the mid 19th century with the discovery of gold in the Sierra foothills. Miners diverted water from rivers and forced it into high pressure jets to remove the rock from the hillside. This released naturally occurring metals, especially mercury and cadmium. Mercury was also used as an amalgam to extract the pure gold from alluvium ores and then dumped directly into the watershed.

Mercury comes out of the ground in its metallic or inorganic form, which is not a great threat to humans. In the environment, though, microorganisms metabolize it into methylmercury, which is lipophilic and as such becomes much more dangerous to wildlife and humans alike. Methylmercury is a known neurotoxin. Symptoms of exposure include impaired peripheral vision, hearing, taste, and smell; slurred speech; unsteadiness of gait and limbs; muscle weakness;

irritability; memory loss; depression ; and sleeping difficulties. It also damages the kidneys and causes death in high doses. Children, particularly fetuses and newborns, are quite sensitive to mercury exposure. Many of their systems continue to develop into their teenage years and exposure to mercury can interfere with this development. (ATSDR – Chapter 3)

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All of these compounds exist in the sediment of our estuary. If they are released into the water column, they will enter the food chain, eventually accumulating in the large, predatory, long-living fish that humans eat. Because the chemicals accumulate over time, the levels in a fish's meat can be millions of times higher than in the surrounding water. Thousands of people eat these fish caught from the Bay each year. Our first priority should be to the health of these people and the health of their families.

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Suggestions

The following are specific suggestions to ensure that this project will have minimal impact on human health and aquatic wildlife.

Take sediment core samples at more frequent intervals

As we have shown, much of the proposed route has the potential for heavy sediment contamination, much of it localized. The current plan to test sediment cores every 1000 yards may not accurately reflect this heavy contamination. Especially along the southern shoreline of Suisin Bay, we suggest a more rigorous monitoring program.

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Take sediment core samples to an appropriate depth

Especially in soft sediment, the cable will need to be placed deeper than the one meter standard to avoid recreational marine anchors. The high organic content and fine sediment particles of these softer surfaces also make them more attractive to contaminants. Sediment cores should be taken at a depth consistent with the planned depth of the cable.

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Use best detection methods available

It is not appropriate to group chemicals by class. Many chemicals within one class can act quite differently. In order to accurately detect what chemicals are present in sediment, it is necessary to use a high resolution gas chromatograph or electron capture detection. (ATSDR – Chapter 7) These expensive tests are necessary given what we know about contamination of Bay sediment and its potential health effects.

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13-14 | **Investigate technology for sediment removal**
If it is found that the sediment along the proposed route would release chemicals such that their presence in the water exceeds acceptable limits, it may be necessary to work with Pirelli and other contractors to devise a method for removing the contaminated sediment in an environmentally sound manner and covering the cable with clean sediment.

13-15 | **Recognize incomplete science**
Throughout each stage of testing and design, it is important to recognize that society's understanding of certain processes is not definitive. Many of the chemicals suspended in the sediment have not been tested for health effects or environmental persistence. Chemicals can act synergistically within the body and the water column, one multiplying the effect of another by hundreds of times (Van Birgelen et al., 1996). Any decisions should err on the side of caution, especially as many effects are irreversible and occur society-wide. There are several models for evaluating the rate of chemical re-suspension into the water column. We urge you to consult several before making any conclusions.

13-16 | **Explore Alternative Routes**
Baykeeper would encourage another look at the BART Trans Bay Tube/Federal Highway route to Pittsburgh. With security concerns, it would undoubtedly be difficult to implement this plan, but if sediment contamination proves to be extensive, it may be more efficient to come up with a way to prevent security breaches rather than manage polluted sediment.

13-17 | **Understand historical contamination**
In discussions with the Project Coordinators and Engineering team, some questions arose about the depth at which contaminated sediment in the Bay lies as well as the depth of the Active Sediment Layer. We recommend that these questions be resolved as soon as possible. See the Davis, Fuller and Ling papers referenced below for a discussion of these topics.

13-18 | **Understand impacts to benthic communities**
This letter has dealt primarily with Bay sediment contamination and its impacts on aquatic wildlife and human health. This letter does not preclude further comment on the sensitivity of the benthic communities impacted by this proposal. We urge that a full understanding of the project's impact on the benthic habitat be developed.

Please contact us if you have a question about these comments. And once again, thank you for this opportunity to provide input.

Sincerely,

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